PULP & PAPER

JANUARY 1958

Outlook for Paperboard
page 39

"Special" on Chlorine Dioxide
page 46

How's Valentine Coming?
page 52

see page 44

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- Nitric Acid
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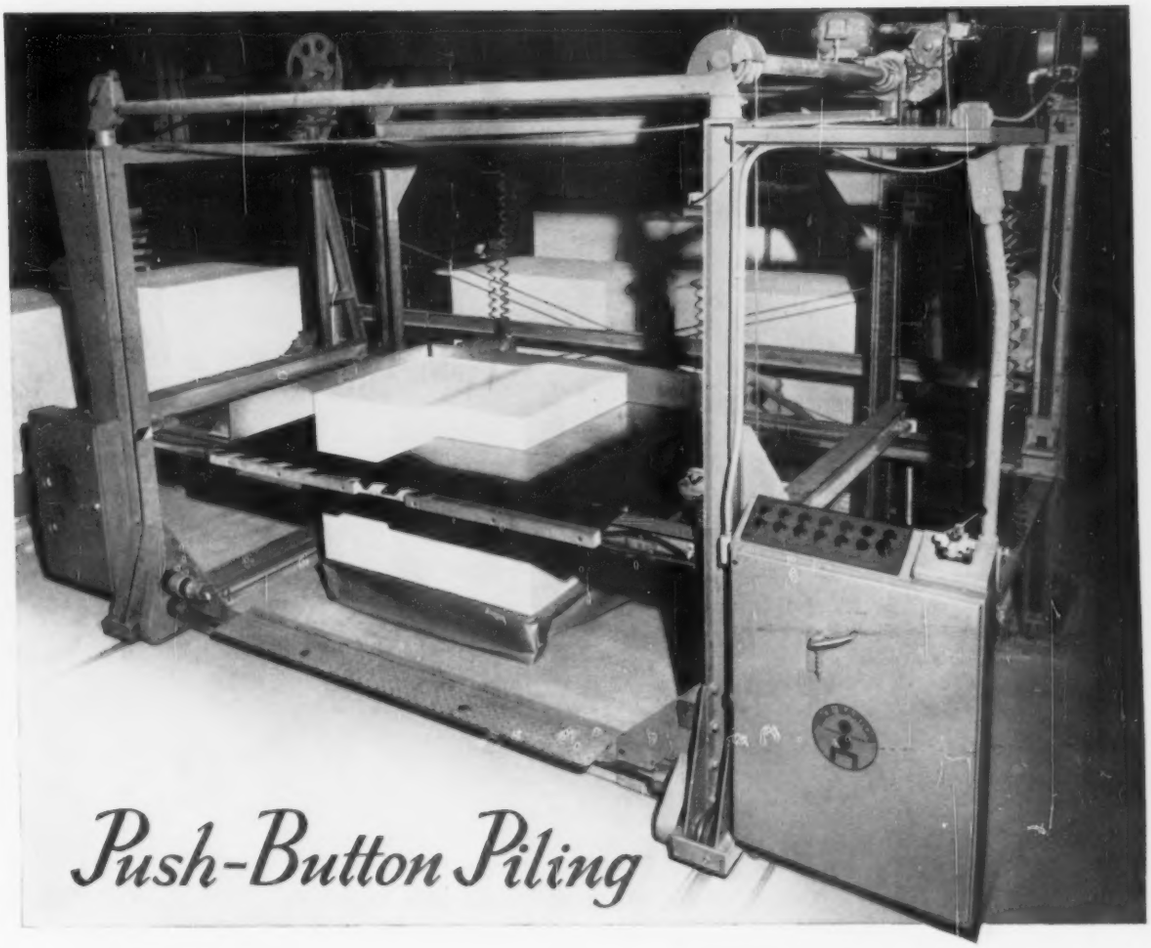

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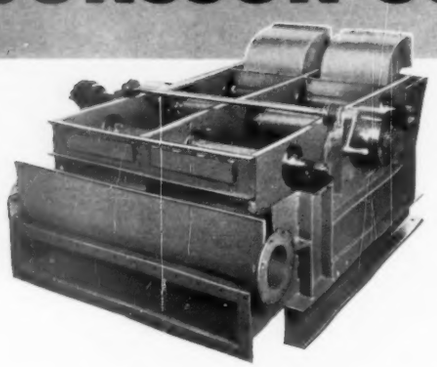

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PULP & PAPER

Reader's Guided Tour

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NUMBER 1

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How Bagasse White Paper is Made 52

Down in Hurricane Audrey country, where there's as much water as land, P&P's Bill Diehl pictured and wrote about Valentine Pulp & Paper Co's success and describes its improved process.

Where Do We Stand in ClO_2 Bleaching? 46

The answers are given by an authority who has served nearly all the mills now using chlorine dioxide. In a special article for PULP & PAPER, Dr. W. Howard Rapson also looks into future for this key to brightness, compares processes, gives costs.

Paperboard Industry Outlook and Problems 39

A healthy recovery is taking place but a lot of capacity is coming in. Odor research is successful. A cancer specialist's alarming statements are disputed. Labor outlook is discussed. Rubber dunnage is proving popular.

Russian Pulp-niks and Paper-niks 17

A special feature of this issue is a review of some new Russian technical works in this industry—and first news of some of these developments to reach the Western world.

Fred Weyerhaeuser Predicts 105

New president of WTCo. sees plenty of wood ahead; even old growth will last into 21st century. Foresters will also be managers of water and of recreation. There are problems ahead—government land and timber policies have bad as well as good sides.

Equipment Used in Small Wood Processing 108

In Montana, a famous mining company is making chips for the state's first pulp mill. Barker operation is about 90% automatic, TV is used for chip distribution.

● COVER PICTURE

In this "only in Texas" style, some 60 crewmen almost obscure Champion's 216-in. "Life" machine which they helped rebuild in record time at the Pasadena, Tex., mill. Story on page 44.

CIRCULATION DEPT., 500 Howard St., San Francisco 5, Calif. C. C. Baake, Circ. Mgr. Send subscription orders and changes of address to PULP & PAPER, above address. Include both old and new addresses.

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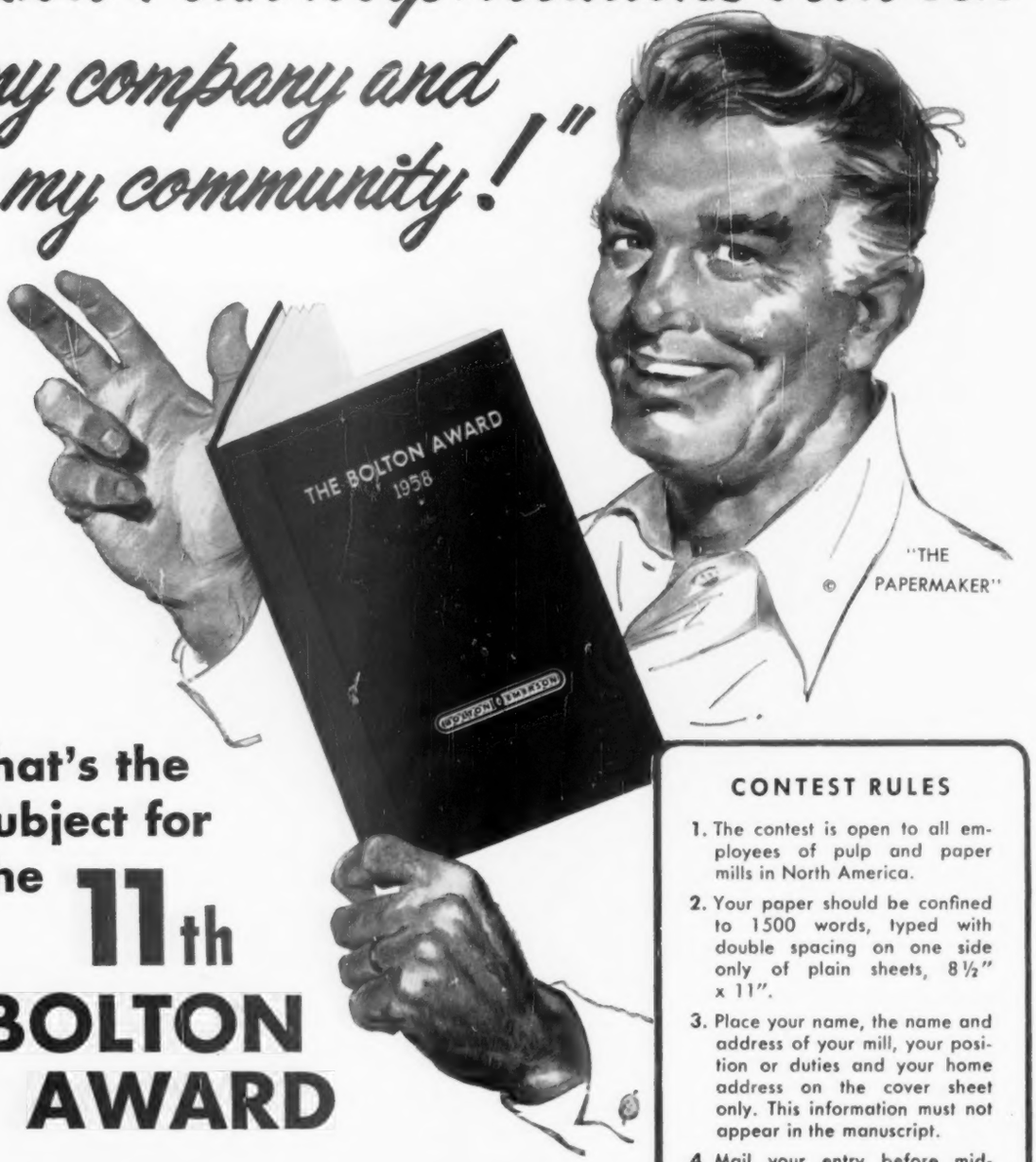

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CONTEST RULES

1. The contest is open to all employees of pulp and paper mills in North America.
2. Your paper should be confined to 1500 words, typed with double spacing on one side only of plain sheets, 8½" x 11".
3. Place your name, the name and address of your mill, your position or duties and your home address on the cover sheet only. This information must not appear in the manuscript.
4. Mail your entry before midnight March 31, 1958 to: The Secretary and Treasurer, The American Pulp and Paper Mill Superintendents Association, 327 So. LaSalle Street, Chicago 4, Illinois.

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THE EDITOR READS HIS MAIL

Address letters to The Editor, PULP & PAPER, 1791 Howard St., Chicago 26, Ill.

U.S. Visitor Compares Meetings

—Whitchurch, Hants., England

Editor: On my visit in the U.S.A., I was able to study very interesting new developments in plant and techniques.

I found the Engineering Conference in Cincinnati excellent in every way. Organization had obviously received meticulous attention. Papers were generally well presented and the timetable was as strictly maintained as a military operation. And, yet, there seemed ample opportunity for making new friends and exchanging views.

In contrast, the 12th Plastics and Paper Conference in Cincinnati, a fortnight later, lacked the dynamic atmosphere of its Engineering counterpart.

ALAN J. TOOTH
Development Engineer,
Portals Ltd. (mfrs. of currency papers)

Ideal Land Clearing Machine

—Grand Rapids, Minn.

Editor: On page 169 of your WORLD REVIEW NUMBER for 1957, you illustrate a land clearing machine. Can you tell us the stage of progress this machine is in and whether it is actually being built and if so, where is it being built and how can we keep in touch with this development.

C. H. SCHACKER
Secretary,
Blandin Paper Co.

—Sylacauga, Ala.

Dear Mr. Schacker: PULP & PAPER notified me of your interest in my "Cloud Mine" conception of an ideal land clearing machine. For that reason, I am sending you a copy of the Southeastern Technical Committee Meeting Minutes which provides additional background information not only on the machine, but on the South's attitude toward "Forest Land Cultivation."

The "ideal land clearing machine," as such, is not being built. But surprisingly enough, some of its features are receiving consideration as being worthy of further exploration.

In addition, we are thinking more about the development of mechanical tree planters which discard the idea of a plowed furrow. We are looking closely at direct seeding as a yet unexplored technique of rapid reforestation. With time and effort, it is believed that we in the South may well be planting treated seeds instead of seedlings, such seeds being spaced as we now space seedlings, but at a cost far less than present techniques now require.

J. A. HOLEKAMP
Southern Forest Engineer
American Pulpwood Assn.

Interest in Paper Pavilion

—Antwerp, Belgium

Dear Albert,

Editor: PULP & PAPER'S recent publication of my letter about the Pavilion of the Paper and Graphic Industries at the Brussels World Fair of 1958 interested some of your readers, as it brought me some letters from the States enquiring for further particulars.

Very truly yours,
WILLIAM F. BOKS
Gross & Irgens,
Woodpulp Agents

Labor Rates in South

—St. Mary's, Ga.

Editor: In reviewing my letter to you (published in Oct. PULP & PAPER) I find a typographical error. My letter should have indicated that *with the exception of* skilled labor the average labor rate at the sawmills in Georgia and Florida is $1.00 per hour. In other words, the common labor rate runs from $1.00 to $1.10 per hour as a general rule.

C. MATHEWSON
Mgr., Wood Procurement
St. Mary's Kraft Corp.

World Famed University Gets P&P

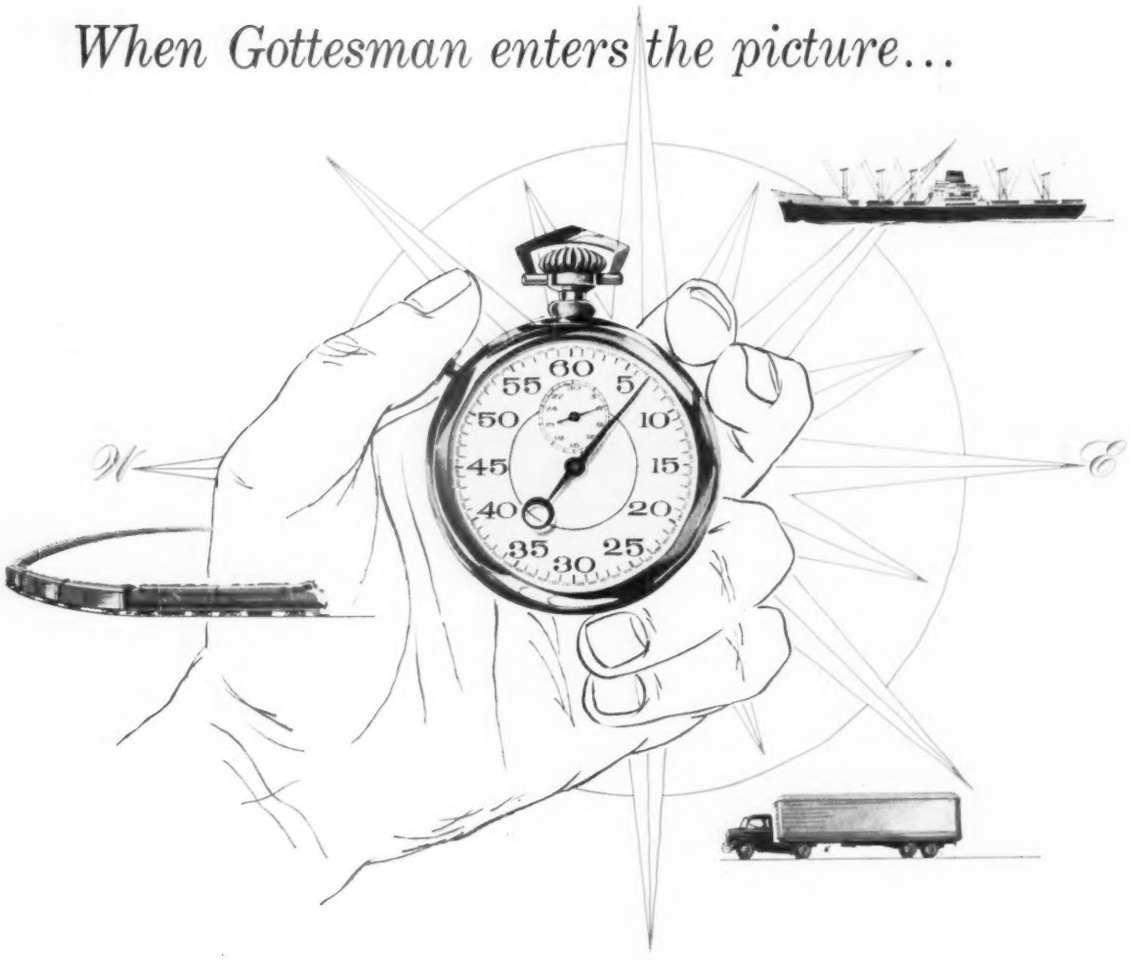
—Paris, France

Editor: It is a pleasure for me to report that PULP & PAPER is very much appreciated by our American Library in Grenoble University.

We are growing all the time and it is our hope to open branches next year in the two important industrial towns of Clermont-Ferrand and Saint-Etienne.

HENRI JEGU
Vice President of the
American Library in Paris

When Gottesman enters the picture...



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PULP & PAPER Monthly Report

... of significant news and views

General Outlook . . .

HOW 1957 ENDS . . . HOW 1958 LOOKS. . . . U.S. paper and paperboard production is ending 1957 with total production of about 30,700,000 tons, compared with 31,438,000 in 1956. Paper and board mill operating capacities were about 91% in early December, for year to date. Paper ran 97.8% an dboard 94% in 1956. With total capacity of over 36,000,000 tons coming in for 1956, the mills only operate at about 84%, if they run as well as in 1957. It may be a year to battle through, before the next rise.

FUTURE OUTLOOK FOR PAPERBOARD. . . . National Paperboard Assn., meeting in New York, hears both dark and bright side of the picture for 1958 and years ahead, while production records are set. Research in board odor is successful; collective bargaining may be stiffer; waste paper harder to get (see story in this issue). . . .

LOOK FOR GREATER SPENDING for defense and foreign aid, to counter Russian advances. President Eisenhower and other top officials outlined proposals at bi-partisan meeting of legislative leaders. Congress will be asked to approve an increase in military outlays from $500 million to $2 billion above the original $38 billion estimate for fiscal year ending next June 30. Foreign aid request is expected to be $3.9 billion. . . .

SEES HEALTHY FUTURE FOR PULP INDUSTRY. . . . James L. Ritchie, exec. director of U.S. Pulp Producers Assn., says, "In both total pulp and market pulp, the current position of the industry is stronger and the general outlook better than many pessimists, including myself, had feared it might be. I am much more confident today than I was a year and a half ago that our industry will successfully weather any economic disturbances in the short-term and live to enjoy a healthy future over the longer term."

SALES HIT ALL-TIME HIGH. . . . Crown Zellerbach's sales for October established an all-time high, reports Pres. A. B. Layton. "Incoming orders to date continue strong," he said. Marathon Corp. reports record net sales of $155,408,191 for the 1957 fiscal year, an increase of $2,521,788 over the company's previous high of $152,886,403 in 1956. . . .

$15 BILLION FOR PACKAGING, divided among our population of 170 million, gives a figure of $88 that we spend for packaging every year for each man, woman and child in the U.S. Each of us uses 676 folding boxes, about 113 new glass containers and 236 metal cans during a 12-month period, according to Herbert B. Woodman, president, Interchemical Corp. . . .

PREDICT PULP CHIP CAPACITY OVER 1,000,000 CORDS A YEAR. . . . So many Southern mills have installed debarking and chipping machinery that by Jan. 1958 the industry expects to have total pulp chip capacity of over one million cords a year. . . .

K-C OPERATES AT FULL PRODUCTION. . . . Demand for all Kimberly-Clark Corp.'s major products continues at a high level, requiring full operation of production facilities, according to John R. Kimberly, president and chairman. Net sales of $87,651,201 in the three months ended Oct. 31 compared with $84,597,542 in the same period of 1956. K-C purchased 35% of the capital stock of Irving Pulp and Paper, Ltd. Irving operates a sulfite pulp mill at St. John, N.B. and is building an 85,000 ton sulfate mill scheduled for completion by 1960. . . .

Please turn page for more

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Colder than ice water ...yet flows freely!

If you are considering a liquid alum installation, here's good news in connection with any possible "freeze-up" worries. Cyanamid's Liquid Alum won't crystallize even at sub-freezing temperatures.

Well worth your investigation are the year-round advantages of Cyanamid Liquid Alum—lower cost, labor savings and easier, neater handling. Our extensive know-how on dry-to-liquid conversions is available through our local representative to help in your planning.

HELP WANTED?

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BETTER SHEET FORMATION

Better disintegration of fiber bundles and improved distribution of rosin size is credited by an Indiana mill to ACCOCEL® 741 when added in very small amounts to the breaker beater.

FOIL RATTLE BEAT

A Wisconsin mill eliminated the harshness and rattle on lightweight aluminum foil backing papers by switching from regular rosin size to CYFOR® Fortified Rosin Size. Now much less is required on the fiber to give consistently good results.

NON-STICKING AT DRIER

One mill has found that in addition to its wet-strength advantages, PAREZ® 607 Wet-Strength Resin aids in keeping paper from sticking to high speed driers.

TAKING STOCK

Mills everywhere must take stock of paper market trends, and plan accordingly. We do it, too. That's why Cyanamid continually develops new and improved products for the paper industry . . . and that's how Cyanamid can offer the largest line of paper chemicals available to mills and fabricators. The Paper Chemicals Department is at your service

BEAT STICKING AT LOW

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PULP & PAPER # Monthly Report

. . . of significant news and views

Mills and Mill Plans . . .

WILL START CONSTRUCTION EARLY IN 1959. . . . Pres. Karl A. Clausen says construction will begin on Nova Scotia Pulp Ltd.'s $40,000,000 pulp mill in the Strait of Canso region of Nova Scotia in about a year. Planned production of the new mill is more than 300 tons of high-grade bleached sulfate daily. . . .

NEW MILLS IN SOUTH. . . . Dierks Paper Co.'s new $12,000,000 kraft paper and liner board mill at Pine Bluff, Ark. has been completed by The Rust Engineering Co. Dierks Paper is a new division of Dierks Forests, Inc. . . . Crown Z-Time started construction of their machine coated paper mill in St. Francisville, La., recently. Container Corp. of America will be starting up production about February at its mill at Brewton, Ala. . . .

ClO_2 BLEACH PLANT TO BE READY BY JULY, '58. . . . Brunswick Pulp and Paper Co.'s new chlorine dioxide bleaching process will replace two hypochlorite stages with ClO_2. At present the bleach plant consists of five stages, the first two primary and secondary chlorinations with the second stage modified to permit flash hypochlorite reaction. These are followed by three stages, the third and fifth hypochlorite and the fourth an alkaline extraction. The third and fifth will be changed to ClO_2. . . .

TO COMPLETE EXPANSION IN 1959. . . . Sorg Paper Co. expects to complete its expansion program, including installation of new stock preparation equipment for No. 4 paper machine, rebuilding that machine and construction of a new warehouse in 1959. This will make $7,000,000 that the company has spent on capital improvements in the past ten years. . . .

WILL USE CELLULOSE OVERLAY. . . . Simpson Logging Co. is adding facilities to make overlaid plywood at its Olympic plywood plant at Shelton, Wash. Plywood will be faced one or both sides with medium or high density resin-cellulose sheets, making smooth, strong panels which are waterproof and weather resistant. A market study revealed growing demand for overlaid plywood. . . .

AUTOMATED PLANT DUE FOR JAN 1 STARTUP. . . . Graham Paper Co.'s new manufacturing and converting plant in St. Louis will have automatic spacers, scoring and shear cutting equipment and the most modern rewinders and slitters to increase production and make available many new items for modern office uses. Finished products will be handled on pallets with electric straddle type warehouse trucks. . . .

Other News . . .

METALIZED PAPER IS IN THE OFFING. . . . The National Research Corp. has perfected a vacuum process to deposit metal coatings on paper and paperboard and is test marketing several products which may be competitive with laminated aluminum foil. A production-scale paper metalizer is being constructed and substantial sales volume is expected within the year. . . .

NEW FIBER NOW AVAILABLE. . . . Virginia Cellulose Dept. of Hercules Powder Co. announces a new fiber designed for use in manufacture of high-strength fine papers. The new product, HXV-20, is said to give improved brightness and cleanliness, compared to rag pulps, and is available in ready-to-use form. It also gives improved formation, watermarking and finishing and freedom from knots and pills, compared to other high-strength linters based on longer fibers. . . .

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PULP & PAPER Monthly Report

... of significant news and views

NEW NAME FOR LONGLAC PULP AND PAPER CO. . . . The Kimberly-Clark subsidiary at Terrace Bay, Ont., is now called Kimberly-Clark Pulp and Paper Co., Ltd. . . .

OVER 99% FOR RAYON TIRE CORD. . . . Over 99% of all land speed records have been set on rayon hi-test tire cord, and over 99% of all 1957 cars were equipped with rayon hi-test tires at the factory. . . .

WTC GETS HAWAIIAN PLANT. . . . Weyerhaeuser Hawaiian Co., newly formed subsidiary of Weyerhaeuser Timber Co., acquired Dole Hawaiian Pineapple Co.'s Honolulu container plant. Pres. of the Hawaiian subsidiary is Howard W. Morgan, v.p. of WTCo., Tacoma, Wash., and vice. pres. is R. J. Scoutten, mgr. of Pacific Coast and Hawaiian div., Kieckhefer-Eddy, San Francisco. Container board used in Honolulu will continue to be supplied by North Carolina Pulp Co., Plymouth, N.C., subsidiary of WTCo. . . .

WILL BUILD $10,000,000 PLANT. . . . The century-old Pennsalt Chemicals Corp. will expand into the busy British Columbia market. Pres. William P. Drake of Philadelphia announced that a $10,000,000 plant will be built in the Greater Vancouver area. . . .

ELECTRICAL EMPLOYES JOIN UNION. . . . For the first time in its history, West Virginia Pulp and Paper Co.'s Tyrone, Pa. mill will have a union representing some of its employes. The International Brotherhood of Electrical Workers (AFL-CIO) won a vote of 13 for the union and eight against it to become bargaining agents for 21 electrical employes. . . .

BIG EXPANSION FOR CANS. . . . Physical expansion of American Can Co., now merged with Marathon Corp., facilities during 1957 totals about 1,500,000 sq. ft. in 15 cities, says G. W. Reese, v.p. for mfg. Expansion accounts for a substantial part of capital expenditure totaling $52 million. . . .

BRITISH COLUMBIA WORKERS STRIKE. . . . An industry-wide strike in British Columbia's pulp and paper industry involves some 6,000 men. The union voted 85% for strike after rejecting a conciliation board's recommendation for a 7 1/2% wage increase. Present basic wage is $1.72 per hour and the unions are holding out for an increase of 12 1/2%. . . .

ENGINEERING FOR ABITIBI'S NEW MILL. . . . Johnson & Johnson Engineers, Chicago, did engineering for pulp and board manufacturing processes at Abitibi's new hardboard mill at Alpena, Mich. which started up recently. Stone & Webster engineered the power plant, wood yards, wood handling and water clarifying plant and were general contractors for all construction work. Several of Abitibi's own engineers acted as consultants on the job. . . .

SAWMILL WASTE PROVIDES 13% of requirements of Champion Paper and Fibre Co.'s Texas div. mill. That's the equivalent of 150 cords of wood daily. . . .

WILL PROBE FOREST MANAGEMENT LICENSE SCANDAL. . . . Chief Justice Gordon Sloan will investigate British Columbia's forest management license scandal. A Vancouver lawyer, David Sturdy, implicated the former minister of forests, R. E. Sommers, in an alleged payoff by companies trying to obtain forest management licenses. . . .

COULD SUPPORT 300-TON PULP MILL. . . . Sandwell & Co. surveyed possible plant sites for the Oregon state department of planning and development, reports enough water is carried by the North Umpqua river to support a 300-ton pulp mill. . . .

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Nopco Wax Sizes perform at least 4 important functions to help you make high quality paper and board that will give you an edge in today's highly competitive market.

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With any of these sizes goes the skilled counsel and wide experience of Nopco's paper technicians. They will welcome the opportunity to work with you on the toughest problems you have. Write today for their recommendations.
Nopco Chemical Company, Harrison, N. J.

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	A	B	C	F	K	L	M	N	W	X	A	B	C	L	A	M	X	1245A	2252	KKE	KKE-1
Improved Finish	✓	✓	✓		✓	✓		✓		✓	✓				✓		✓	✓	✓		
Improved Fold	✓		✓				✓			✓					✓	✓	✓		✓		
Improved Calender Staining	✓									✓					✓		✓				
Oil Resistance							✓						✓			✓				✓	✓
Ink Resistance		✓	✓							✓		✓		✓			✓	✓	✓	✓	
Blood Resistance		✓					✓			✓				✓			✓	✓	✓		
Lactic Acid Resistance				✓				✓					✓								✓
Hot Liquid Resistance								✓					✓								✓
Grease Resistance		✓	✓				✓			✓											
Scuff Resistance		✓	✓				✓		✓	✓		✓	✓								✓
Printing Qualities	✓	✓			✓					✓	✓	✓	✓		✓		✓		✓	✓	
Starch Coating Lubricant	✓				✓	✓				✓					✓		✓	✓	✓		
Decrease Fuzz	✓	✓				✓				✓					✓		✓	✓	✓		

1907–1957 50 Years of Progress in Chemistry

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WORLD PULP & PAPER General News

No Concern Over Europe's Wood
Geneva, Switz. . . . Continued stability of European timber market is foreseen by the timber committee of the United Nations Economic Commission for Europe, now ten years in existence. Estimates for pulpwood for 1958 revealed an apparent net deficit of over 1,000,000 cu. meters. However this represents less than 2% of Europe's total needs for small-sized roundwood. The committee was not concerned, and said stability in the pulpwood market has been greatly aided by early placing of contracts. Thanks were expressed to Russia for "excellent arrangements and a study tour" provided at the joint FAO-ECE meeting on forest work techniques and training of forest workers, held in Moscow in September.

Trying to Increase Exports
Leipzig, East Germany . . . The East German paper industry showed a greater variety of paper products than in the past at a recent Leipzig fair. The head of the Central Administration of the East German Pulp, Paper and Cardboard Industry, said it was necessary to increase exports in 1957 by 10% above the previous year.

Visit U. S. Mills
New York, N.Y. . . . S. S. Harkavy, director, Paper Dept., Geigy Dyestuffs, escorted Derek A. Knight, technical director of Wiggins Teape mill at Dover, England, on a week's visit to various paper mills recently. The Dover mill makes saturating papers. Other recent guests at U. S. mills were representatives from Oskar Steffen & Co., Wolhusen, Switzerland, and Gojo Paper Mfg. Co., Ltd., Yoshiwara, Japan.

New Manager of Mexican Mill
Mexico City . . . Herbert M. Byrd, manager of Sonoco Products Co.'s Akron, Ind., plant since 1953, was promoted to manager of the company's subsidiary here, Sonoco de Mexico. He replaces R. B. White, Hartsville production manager, who had been temporary manager in Mexico since April.

Consultant to Pakistan
Madison, Wis. . . . Axel Huttinen, research chemist at the U.S. Forest Products Laboratory, returned recently from Chittagong, East Pakistan, where he assisted in pilot plant research on pulping gewa, a native hardwood, for newsprint. The color of gewa is such that little bleach is needed to get whiteness. The mill is being built for the Pakistan Industrial Development Corp.

Back Brazilian Mill Project
San Francisco, Calif. . . . A syndicate to finance a $9,000,000 pulp and paper mill in Pernambuco, Brazil, was set up at the International Industrial Development Conference sponsored by Time-Life and Stanford Research Institute. Norbert A. McKenna, partner in Reynolds & Co., and Roberto de Oliveira Campos, representing Brazil's National Economic Development Bank, are backers.

Russia Short on Paper Machines
Moscow . . . A recent issue of the *Soviet Industrial and Economic Gazette* reports that there is a shortage of newsprint, kraft and cardboard machines in Russia. The article recommends more attention be given to drying cylinders and that paper machines be equipped with more drying drums in order to reduce drying time. In general, the industry needs much closer cooperation of paper machine designing institutes.

Bagasse Mills Rise in Cuba
Havana . . . Sugar may become just a by-product in Cuba as bagasse pulp and paper mills come into production. A 100-ton per day newsprint mill is due to start up in 1958 at Cardenas. Two insulating and hardboard plants are under way, one at the Francisco sugar mill on the coast south of Camaguey, the other near Cienfuegos. Two printing and kraft paper mills will begin operations in 1958 at Havana and Cotorro. A 10,000 ton cellulose pulp mill is scheduled for 1959.

West German Plant Starts Up
Bonaforth, West Germany . . . Westfaelische Zellstoff AG Alphalint has started up a new cellulose mill at Bonaforth. The new plant cost about $3,262,000 and at full capacity will produce approximately 17,600 tons of beechwood cellulose annually.

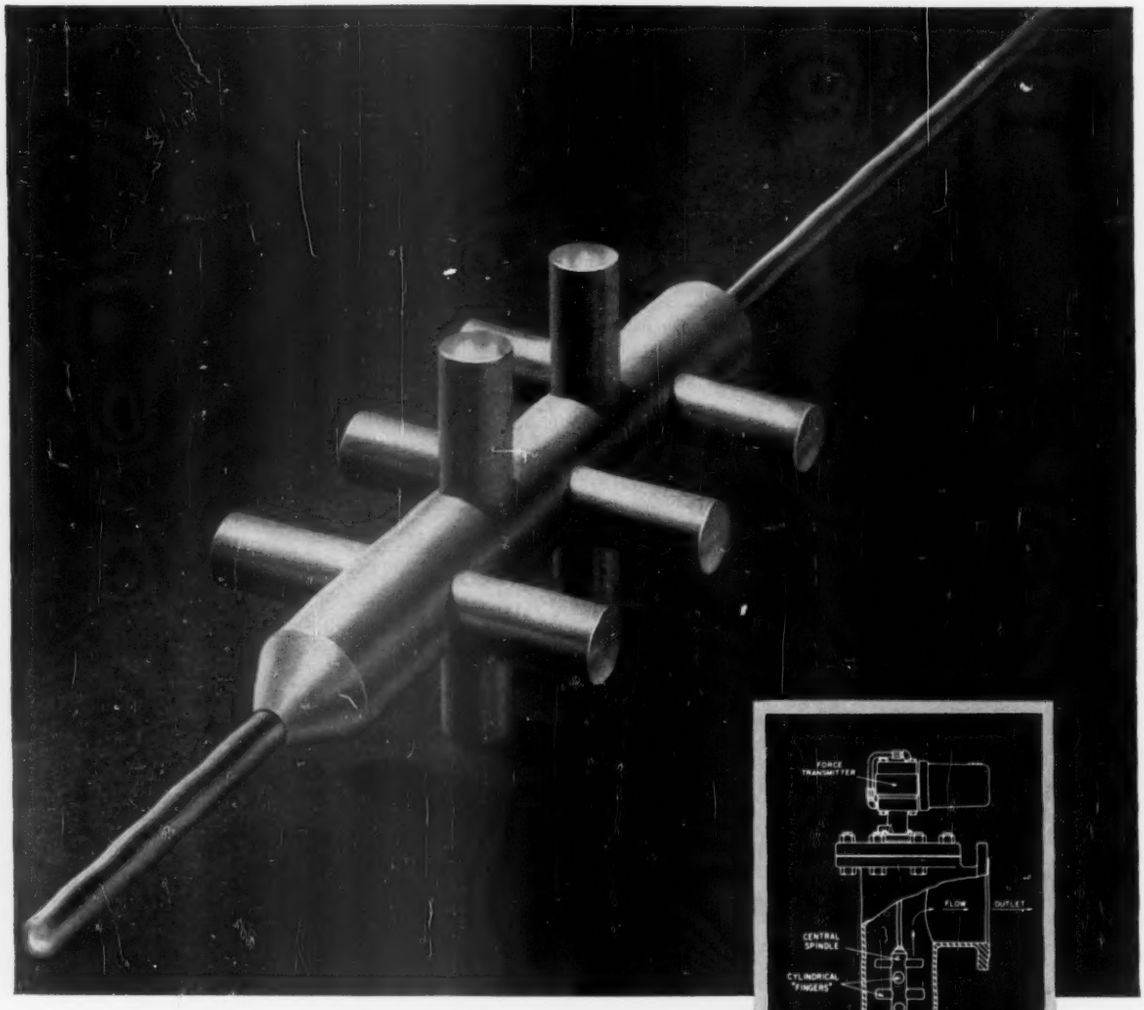
To Build South African Mill
Bellville, South Africa . . . South African Board Mills, Ltd., will build a large cardboard plant at Bellville, to about 12 miles from Cape Town. The new mill will be the first at Bellville to use purified sewer water for industrial purposes.

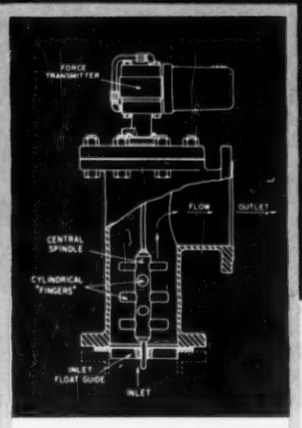
Board Mill Opens in Wales
Queensferry, North Wales . . . A new insulation board mill, first fully integrated Forestry Utilization Industrial Unit in the British Isles, was opened here by J. R. Gordon and Co., Ltd. It uses forest thinnings and waste wood from company sawmills. Daily capacity is 100,000 sq. ft. Woodpulp is produced by Biffar and Jung process. The main equipment is German, Swedish and Swiss.

Continued on page 15

Taking a Break at Pakistan Mill

The Karnaphuli mill employs about 3,000 persons who earn 4 million rupees (approx. $832,000, or an average of $278 each) per year. The mill is constructing a colony to house the entire labor force. Mosques, hospitals, schools and playgrounds will be provided.





The many fingers projecting from the central portion of the float cause the flowing stock to be sheared or deformed about them. This kneading action of the fingers creates a force which is sensed and pneumatically transmitted by a *force transmitter*. The resultant force is proportional to stock consistency. Variations in flow rate over approximately 10 to 1 range do not affect the consistency reading.

Sensitive fingers measure and control consistency

The unique object shown in the photo is a specially designed float used in the New F & P Consistency Regulator. This regulator *now* makes it possible to *continuously* measure and *automatically* control pulp and paper stock consistency . . . with complete immunity to velocity and freeness changes. Mounted directly in the process pipe line or in a sample line, this amazingly simple device measures stock consistencies in the range of 2% to 8% *with an accuracy of* ± *0.1%*.

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FISCHER & PORTER CO.

Complete Process Instrumentation

WORLD PULP & PAPER General News

(Continued from page 13)

Plan Mill in British Guiana
Georgetown . . . Plans for a $40,000,000 U.S.-owned pulp and paper mill in British Guiana were announced following talks between the Columbium Corp. of America and officials of the Colonial Government. Laboratory tests of 21 types of Guiana wood have recently been completed.

Sweden's Biggest . . .
Stockholm . . . Ary Manufakturverk is building what will be the largest chipboard plant in Sweden at Aryd.

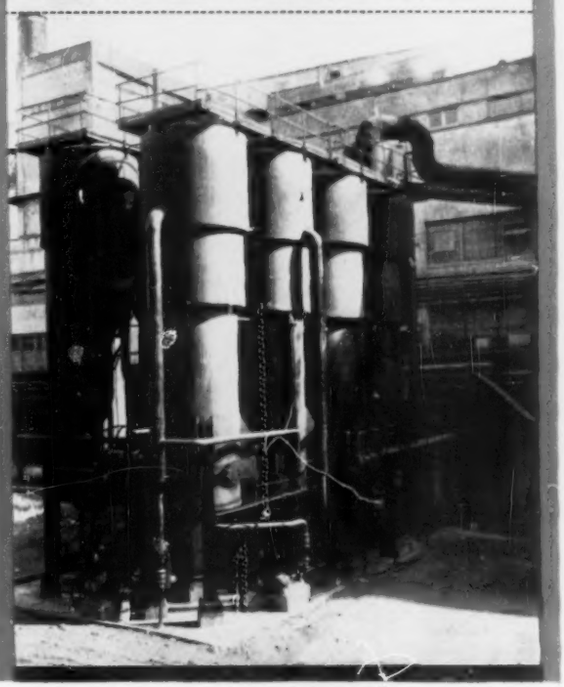
Paper Use Rises in Sweden
Stockholm . . . Sweden's per capita consumption of paper and board has risen an average 5.6% annually in 1937-55. Wrapping paper rose 167%, board and cardboard 160% and newsprint over 90%.

New Mill in East Africa
Beira, Portuguese East Africa . . . A paper mill is to be built about 53 miles from Beira. Production will be about 9,000 tons per year. The mill will employ 200 Europeans and several hundred natives.

Pilot Plant in Pakistan
Karnaphuli . . . The Pakistan Industrial Development Corp.'s pilot newsprint plant at Karnaphuli is reported ready to go into production. Capacity is about 1,300 tons per year.

Continuing Expansion
Paris . . . Between 1955 and 1960, the 280 million citizens of the OEEC countries are expected to spend $25.6 billion more on private consumption than they did from 1950 to 1955. Industrial production is expected to rise 25% during the same period. Increases in imports of pulp are foreseen.

87 OF AMERICA'S "FIRST HUNDRED" CORPORATIONS ARE WHITING CUSTOMERS



Crown Zellerbach Reduces Operating Costs with Swenson Evaporator System

Crown Zellerbach answers the need for greater operating economy with this modern septuple-effect system at their Camas, Washington, kraft pulp mill. It evaporates more water per pound of steam than the former unit and gives dependable, trouble-free service. This installation--like 90% of all such septuple-effect recovery systems--is Swenson-designed.

Send for booklet
"An Open Door" shows how efficient Swenson equipment opens the door to lower production costs. Write today. Swenson Evaporator Company, 15632 Lathrop Avenue, Harvey Illinois.

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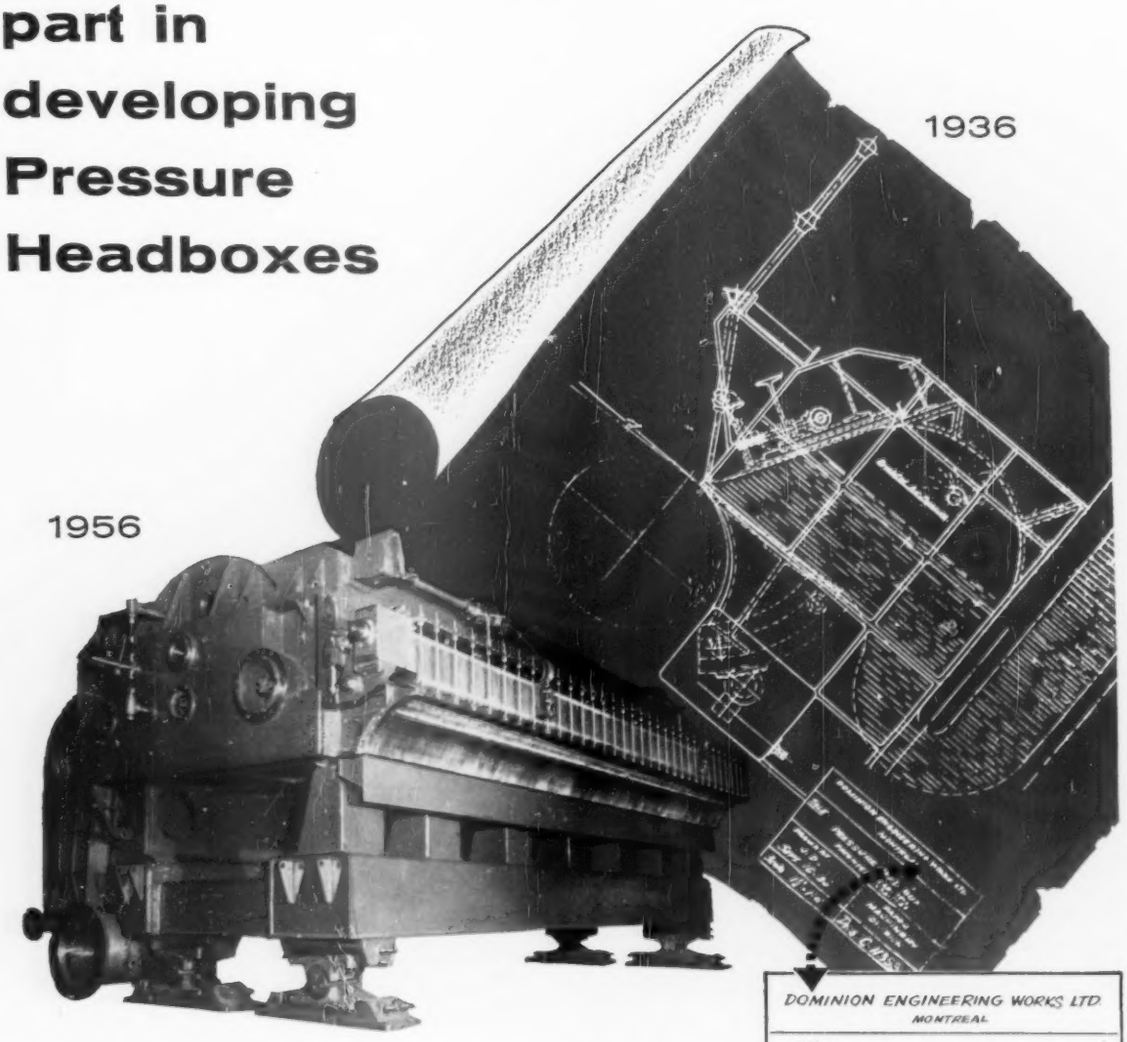
Dominion Engineering's part in developing Pressure Headboxes



The pressure head box is an essential component of all high-speed paper machines. The photo above shows the 1956 version of the original patented design pressure head box, as developed by Dominion in 1936.

Dominion continues to produce advanced designs in anticipation of the pulp and paper industry's demand for faster and more efficient machines.

DOMINION ENGINEERING
COMPANY LIMITED, MONTREAL

WORLD PULP & PAPER Technical News

Russian Reports . . .

. . . Show Progress of Soviet Industry . . .

Assuming interest in what goes on behind the Iron Curtain is not restricted to Sputniks, PULP & PAPER presents an all-Russian technical section this month.

All are translations from Russian by Dr. Julia Stapinski, new member of the Bulletin staff, the Institute of Paper Chemistry. They deal with gas-phase and continuous sulfite cooking, acid-resistant materials for sulfite mills, brown stock washing in diffusers, the durability of paper, and a novel adhesive prepared from tall-oil residue.

(Eds. note: Presented with permission of The Institute of Paper Chemistry, under supervision of Curtis L. Brown, editor of the IPC Bulletin. Photostats or translations of original reports may be obtained by writing Eugene Bunker, librarian, Institute of Paper Chemistry, P.O. Box 498, Appleton, Wis.)

By JULIA STAPINSKI

New Adhesive for Paper . . .

VEDERNIKOV, V. G. Bumazh. Prom. 32, no. 1: 25-6 (Jan., 1957). Bull. Inst. Paper Chem. 28:190.

Tar left after vacuum distillation of tall oil was utilized for the preparation of a new adhesive suitable for paperboard and heavy dark paper. The composition of the tar depends upon distillation pressure and temperature and total acidity of tall oil used. The tar described has a specific gravity of 0.97, a softening temperature of 53-55°C., an acid number of 33 mg. potassium hydroxide/g., a saponification number of 7 g. sodium carbonate/100 g., 15% resin acids, and 37% unsaponifiable matter. To this tar, preheated to 105°C., a concentrated solution of soda is added in amounts sufficient for complete saponification. The mixture is boiled for 3-4 hr., then diluted with hot water to a concentration of 200 g./liter, emulsified with warm water to a concentration of 25-40 g./liter, and coagulated with alumina. This last step must be carefully controlled, as the emulsion is more sensitive to electrolytes than emulsions of rosins. Complete saponification is essential for good results. For shipment, the adhesive may be prepared in solid form by heating the tar with powdered soda for a short time and allowing it to harden; before use it must be dissolved in water and boiled, then diluted and coagulated the usual way. A well prepared adhesive forms a homogeneous grayish-white emulsion after addition of alumina. It is claimed to be a valuable and economic substitute for rosins.

Durability of Paper . . .

YABROVA, R. R. Bumazh. Prom. 32, no. 1: 15-16 Jan., 1957). Bull. Inst. Paper Chem. 28: 230.

Most methods used to accelerate the process of aging of paper involve the use of light and elevated temperatures but do not reflect the natural conditions of paper aging. Thus, the average R.H. of air at room temperature is 35-70%, whereas in the autoclave at 100°C. the R.H. is only 1.7%. To investigate the effects of temperature and humidity on the aging of paper, experiments were conducted under conditions simulating the natural process. After 3 yr. of normal storage, the folding endurance of newsprint and ordinary printing paper was slightly lowered, but tearing strength and stretch were unchanged. In a series of experiments, paper samples were exposed for periods up to 100 days to temperatures of 25, 35, 55, 80, and 95° at a constant R.H. of 73%. No effect on the mechanical properties of paper was observed at 25 and 35°. At 55°, the folding endurance decreased slowly, and at 80 and 95° it decreased considerably (by 44-67%). In another series of experiments, paper was exposed for periods of time up to 30 days to 73, 59, and 20% R.H. at a constant temperature of 80°. A considerable decrease (78.5% in 10 days) of folding endurance and a slight lowering of tearing strength occurred at higher levels of humidity. At 73% R.H., the pH dropped slightly (17.8% in 33 days) and the carboxyl group content and low-molecular-weight components increased 36.3% (in 20 days) and 53.2% (in 30 days) respectively.

Inert Nonmetals in Sulfite Mills . . .

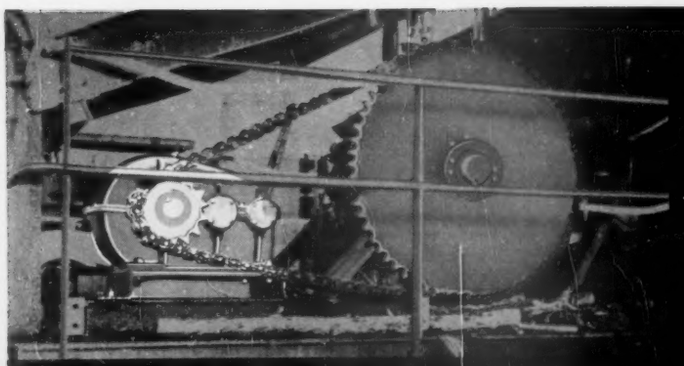
GORYAINOVA, A. V. Bumazh. Prom. 32, no. 1: 22-5 (Jan., 1957). Bull. Inst. Paper Chem. 28: 221-2.

Properties of chemically resistant materials (such as plastics, graphite, and acid-resistant ceramics) are discussed. Various types of these materials have been tested by the author (particularly for their acid resistance). Special attention was given to their suitability for equipment used in the sulfite process. Vinyl resin was found the most suitable and able to replace metals in pipes, pumps, ventilators, blow pits, and other equipment. Two model pumps having parts in contact with liquid made of molded vinyl resin or lined with a vinyl plastic film, as well as a blow pit made of vinyl plastic are illustrated. The techniques of molding and coating (with vinyl or polyethylene films) are described. On the basis of laboratory and plant tests, the following recommendations are made for the use of metal-replacing materials in sulfite mills: Pipes carrying sulfur dioxide (8-9%) or sulfuric acid and blow pits should be made of vinyl plastic for temperatures of 20-50°C. and of faolite asbestos-resin for higher temperatures (up to 150°). Digester pipes carrying sulfite liquor at 95° and under a pressure of 5 atm. should be made of faolite-coated steel, phenol resin-impregnated graphite, or of special steel. Vinyl resin or faolite should also be used for pipes handling hypochlorite equipment. Metal or concrete surfaces of chlorination towers and of sulfuric acid tanks should be covered with acid-resistant bricks, cemented with diabase and an underlayer of polyisobutylene. Vinyl resin should be used for pumps exposed to acids and for exhaust pipes.

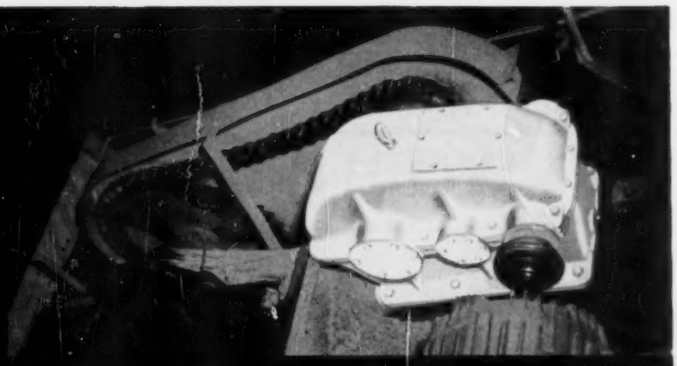
Fast Continuous Sulfite Cooking...

ROZENBERGER, N. A. Bumazh. Prom. 32, no. 1: 10-14 (Jan., 1957). Bull. Inst. Paper Chem. 28: 246.

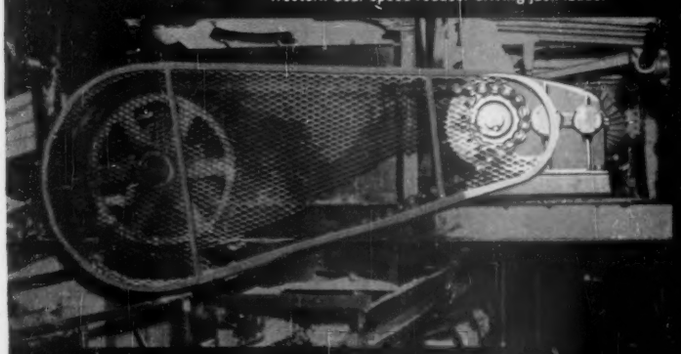
Continuous sulfite cooking should be a fast process aimed primarily at increasing yield. Hence, the highest possible cooking temperature should be used. This requires a good method of pretreatment of chips and conditions preventing condensation of lignin. Thorough soaking of chips may be achieved by using chips of very small size and either sulfite cooking liquor or a solution of a base as the impregnating liquid. Before soaking, the air should be evacuated. Soaking in a base solution should be done at about 50°C., with subsequent replacement of the drained base by a solution of sulfur dioxide. Ammonium, sodium or potassium hydroxides would give best results. However, calcium oxide being commonly used, it should be considered first. Soaking in sulfite liquor (sulfitation) may be done at a



Western Gear speed reducer driving jack ladder

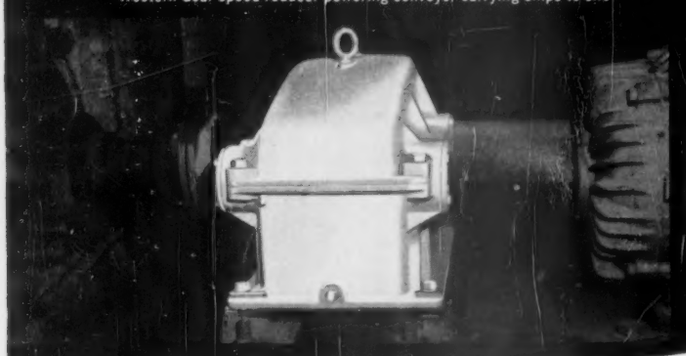


Western Gear unit powering conveyor to two strand scraper



Western Gear speed reducer powering conveyor carrying chips to silo

Western Gear unit power conveyor carrying chips to digestors



Western Gear side entering drive to screen chest

Western Gear vertical drives on stock blending chest

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(Continued from page 17)

higher temperature, but not high enough to cause condensation of lignin. From theoretical considerations it appears cooking at a high temperature (190-205°) for a shorter time would result in less degradation of cellulose. However, the diffusion rate is not increased as much by temperature as is the reaction rate; therefore, a gradual or stepwise raise of temperature to the highest level is advisable. Laboratory cooks using both pretreatment methods were carried out in autoclaves immersed in a hot glycerol bath at various temperatures (115-175°), followed by quick cooling in ice water. From the results it is concluded that with the sulfitation method, the preliminary soaking at 100-110° is required; too high cooking temperatures decrease the yield and quality of the pulp. From technical and economical considerations, the optimum temperature is around 140°; at this temperature and using a rather high acid content (120 g./liter of total and 10 g./liter of bound sulfur dioxide), the cooking time could be shortened to 3-3.5 hr. Pretreatment with base permits the use of higher cooking temperatures (150-160°) without lowering the yield or the quality of pulp and further shortens the cooking time to 40-60 min. The technical problems, however, are more complex with the alkaline pretreatment method. The design of digesters (including feeding of chips, control of cooking, relief of spent liquor and gases, and regenerating system) is discussed. The same equipment may be used for manufacture of semichemical pulp by a continuous process.

Quicker Washing in Diffusers . . .

STRUNNIKOV, N. A., and SLYATSKII, B. I. Bumazh. Prom. 32, no. 1: 17-22 (Jan., 1957). Bull. Inst. Paper Chem. 28: 240.

In an attempt to shorten washing of kraft pulp, certain modifications were introduced in construction of diffusers. Additional filtering screens of various surface area and shape were built in the lower part of the diffusers; the total filtering surface was increased by 40-136%; total washing time was reduced by 28% (from 18 hr. 20 min. to 13 hr. 10 min. for one battery of diffusers); and the concentration of the strong liquor for recovery was unchanged (9.5-10.0°Bé). From these results and from theoretical considerations of the effect of various factors on the rate of filtration, it was concluded that the most important factors are thickness of the filtration layer and the degree of its compression, the total filtering surface being of minor importance. A new type of modified diffuser, called the double-level diffuser, was based on these considerations. A second false bottom was built into a standard diffuser, separating it into two levels: the second bottom was equipped in its center with a conical valve, opening at the time of drainage of the diffuser and closing during the washing process. After a series of trials, the optimum working condition determined for the modified diffusers was washing in pairs, with the two levels filled and evacuated separately but simultaneously. Under these conditions, the washing time was only one-third of that required in the standard diffusers; the loss of strong liquor was only insignificantly increased (from 2.35% to 2.76%) and its consistency was practically the same (9.5°Bé. as compared with 9.7°Bé. from the standard diffusers); only 1-1.5 diffusers were needed per digester, instead of 2-3 standard diffusers. It was concluded that the double-layer diffusers, by considerably shortening the washing time, may contribute to an increase in total efficiency of kraft-pulp production; they are particularly useful for hardwood pulps and for pulps made of softwood of high resin content.

Steam-Gas Phase Cooking . . .

KOPANTEV, M. M. Bumazh. Prom. 32, no. 1: 4-10 (Jan., 1957). Bull. Inst. Paper Chem. 28: 245-6.

It is generally assumed that during cooking, chips have to be immersed in the liquid, because of the necessity of removal of soluble lignosulfonates. While developing a method of sulfite cooking involving transfers of liquor from one digester to another at 105-110°C., the idea was conceived that the cooking could be done with chips partially emerging from liquor. Preliminary experiments gave encouraging results: with thorough soaking of chips a good quality pulp was obtained; insufficient soaking resulted in a large quantity of brown stock; nonsoaked chips were converted to a dark brown mass, disintegrating when rubbed between the fingers. To test removal of lignosulfonates, chips thoroughly soaked in the autoclave were suspended in a perforated steel container in the upper part of the digester and cooked without being immersed in the liquor. The pulp obtained had a permanganate number of 62.8 and its yield was 49.7%; it was concluded that well soaked chips contained a sufficient amount of liquid (65-70%) to dissolve lignosulfonates and other substances. Laboratory experiments and plant-scale trials were carried out by vapor-phase cooking. The method essentially consists of soaking the chips for a prolonged period (up to 5.5 hr.) at a temperature around 100°, removing a part of the liquor, and then cooking in the steam-gas phase at 132-138°. Experimental cooks were carried out at different temperatures, for different lengths of time, with varying amounts of liquid removed, and by varying the composition of the liquor. Control was achieved by observing the levels of both the liquor and the chips in the digester with special devices. In some experiments, soaking was done in the cold after evacuation of air from the chips. The base used in preparation of the liquor was calcium oxide. It was concluded that the steam-gas method of cooking, under proper conditions, gives pulps of good mechanical properties, with the amount of hard cook not exceeding normal limits. The most important factor is a thorough preliminary soaking of the chips either around 100° or in the cold, after preliminary evacuation of air. The composition of the liquor is important: the best results are obtained with a liquor containing 6.8-8% of total sulfur dioxide; the total calcium oxide used was 0.46-0.62% (85 kg. sulfur and 40 kg. calcium oxide/ton of airdry pulp). Digesters should be packed with chips to give 82-84 kg. of airdry pulp/cu. m. of its contents; 30-50% of the total liquid may be removed: the chips are digested in the steam-gas phase temporarily until, toward the end of the temperature-raising period, they are immersed again, compressed by their own weight. The content of reducing substances in the spent liquor is higher than usual (5.5-6%), increasing the production of sulfite alcohol plants. The use of ammonia instead of calcium oxide should be considered, to eliminate difficulties in preparing a liquor of required concentration.

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Stebbins installations can be made under a contract which covers everything, from the original design to the finished job ready for use, including maintenance.

SINCE 1884
Specialists in Design Installation and Servicing of Linings and Tile Tanks

SEMCO

STEBBINS Engineering and Manufacturing Company

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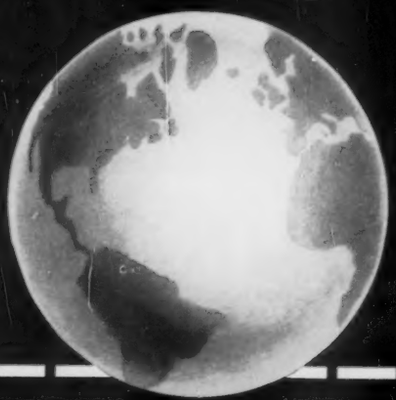
CANADIAN STEBBINS ENGR. & MFG. CO., LTD. — TOWN OF MOUNT ROYAL, MONTREAL 9, CANADA



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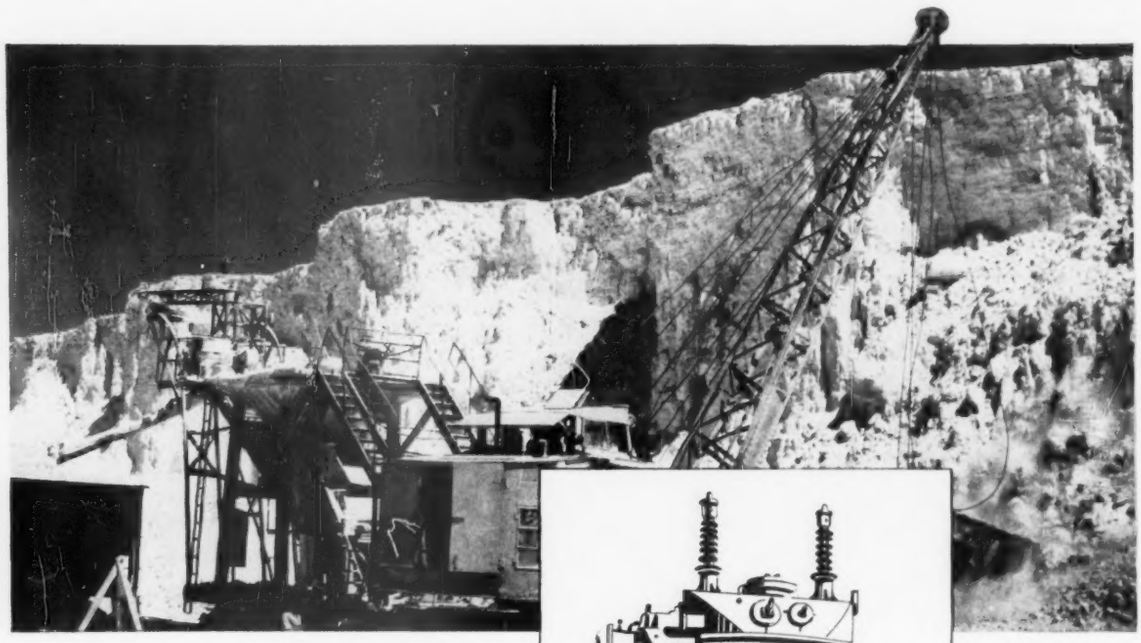
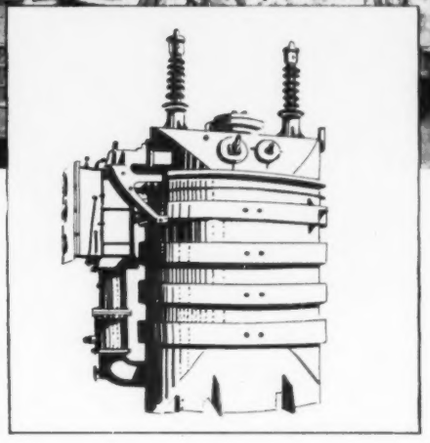
SULPHUR *helps to create Headline Products*





SF_6

A new concept in transformer insulation

GAS INSTEAD OF OIL . . . *that is headline news!*

Sulphur Hexafluoride is a heavy, non-flammable gas and is both chemically and physiologically inert. These characteristics plus its high dielectric strength pin-pointed the heavy duty transformer field as a logical target. And so it turned out!

SF6 instead of oil is now being used in high voltage transformers with the following advantages:

- **operations are much quieter**
- **lighter construction permissible**
- **less restriction in location**
- **lower maintenance**
- **fire-proof and explosion-proof**

In SF6, the electrical and electronics industries are finding a very useful product providing both electrical insulation and cooling. As in so many 'headline' products serving industry, the element S is part of the chemical structure!

Texas Gulf Sulphur Co.

75 East 45th Street, New York 17, N. Y.
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Sulphur Producing Units
- **Newgulf, Texas**
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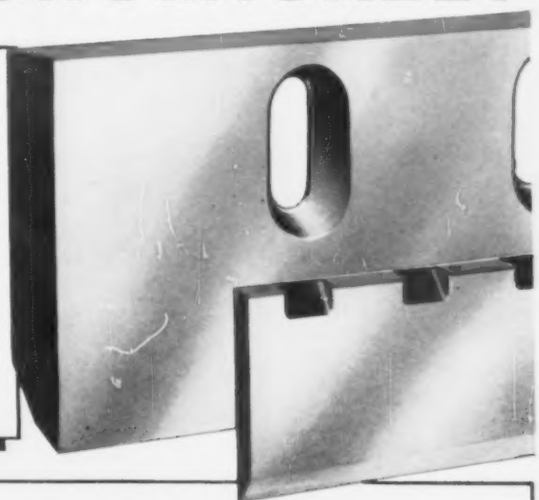
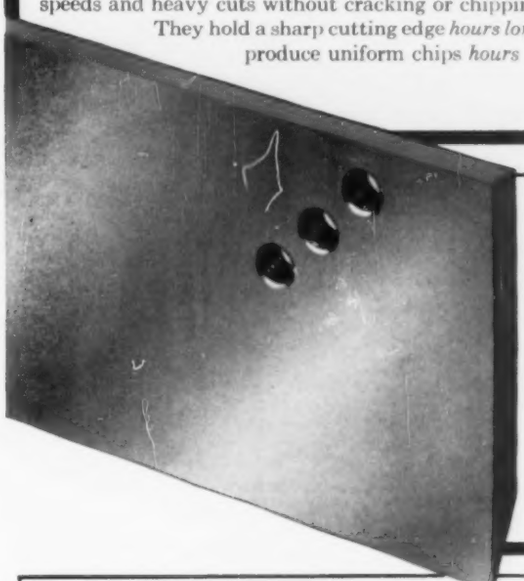
Your Work is Cut Out for You- DEPENDABLY, QUICKLY, ECONOMICALLY

-with SIMONDS T-18 Chipper Knives

More Chips in Good Shape!

For more usable chips and less waste dust, get Simonds T-18 Steel Knives. They're made extra tough to take high speeds and heavy cuts without cracking or chipping out. They hold a sharp cutting edge *hours longer* — produce uniform chips *hours longer*.





-with SIMONDS RED STREAK Paper Knives

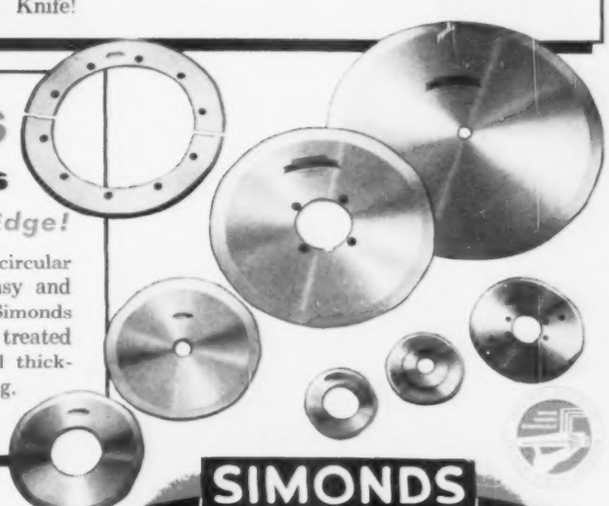
Their Keener Edge Stays Sharp Longer!

Simonds-made S-301 Steel — developed especially for cutting paper — combines maximum hardness with toughness to give you more cuts per grind. Face-side taper, concave ground for added clearance, plus Simonds famous "mirror finish," provide a keener edge that cuts free, fast and straight. There's longer life in a Simonds Knife!

-with SIMONDS Circular Cutters

They Run True and Hold Their Edge!

On thinnest tissue or thickest board, Simonds circular cutters, slitters and perforators cut smooth, easy and true. These "cost cutting cutters" are made of Simonds own special electric-furnace steel — specially heat treated and precision-ground to uniform roundness and thickness. There is no better steel for edge holding. There is no better value for your cutter money.



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When you phone an order or request information, the Sales Office Manager in Oakland with whom you speak can contact the plant at WEST END immediately. He talks by private wire teletype with the shipping superintendent on dates, packaging, transport facilities, car numbers. An answer or firm commitment is given immediately. It is relayed to you often while you are still on the phone.

WEST END's Sales Office Manager sales representatives and plant executives work together as a team manning a system that is, in our opinion, uniquely outstanding in the chemical industry. Their confidence in the efficiency of this system is reflected in the enthusiastic, helpful and friendly manner in which they promptly serve you . . . our customers.

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SALT CAKE
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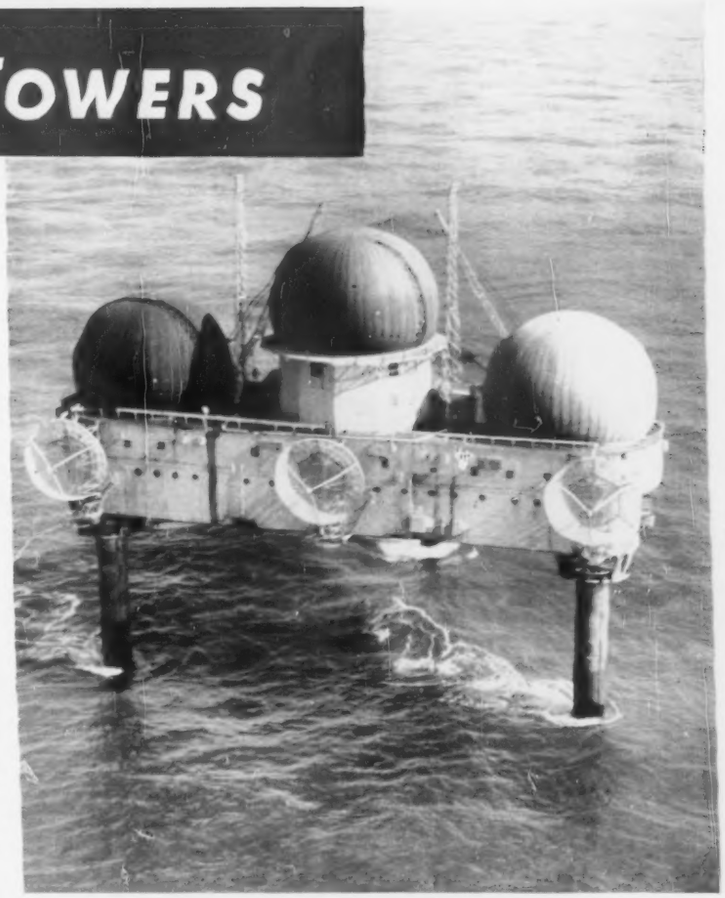

Wallace Process Piping Co., Inc.

Used

MIDWEST

WELDING FITTINGS

Among the unique installations for preservation of peace are the early warning radar "Texas Towers" off the Atlantic Coast. These artificial islands stilted to the ocean floor keep watch by radar. As is true of many defense projects, Midwest Welding Fittings played a significant part on Texas Towers.

Midwest Welding Fittings are found on unusual and in critical as well as routine jobs because of exceptional quality maintained by rigid standards of manufacture. Quality control is always above and beyond code requirements.

Whatever the piping job, you will find it to your advantage to use Midwest Welding Fittings. The many benefits you get by specifying "Midwest" are shown in Catalog 54. Ask your distributor or write us for a copy.

MIDWEST PIPING COMPANY, INC.

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PLANTS: ST. LOUIS, CLIFTON, N. J. and LOS ANGELES

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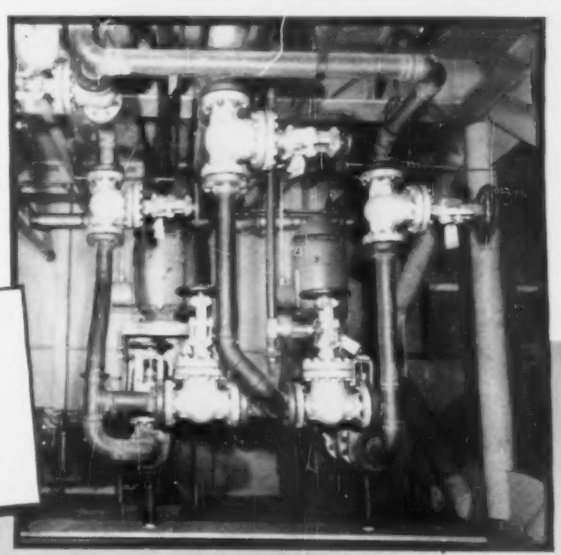

MONEY SAVED With

MIDWEST

"LONG TANGENT" ELBOWS

Here are the important advantages of Midwest "Long Tangents": They save pipe. They often eliminate short nipples and their extra welds. They save time and money in lining up and clamping pipe and fitting. They remove the circumferential weld from point of maximum stress and can be sleeved. Midwest "Long Tangent" Elbows cost no more than other elbows.

Piping on two Texas Towers was installed by Wallace Process Piping Co., Inc., as subcontractors to Steers Morrison Knudsen and Continental Copper & Steel Industries, Inc. All welding fittings were supplied by Midwest through Central Jersey Supply Co. The many advantages of Midwest "Long Tangent" Elbows were an important factor in the selection of Midwest fittings for this critical work.

7901

MIDWEST WELDING FITTINGS IMPROVE PIPING DESIGN AND REDUCE COSTS

They'll both agree on one thing...

Systems vary, and superintendents disagree on treatments — even on the same furnish and for the same end product.

But in leading mills from one end of the country to the other (and in a good many foreign mills), whatever the furnish, whatever the end-product, whatever the system, you'll find Jones equipment — producing better stock, more efficiently and more economically.

Only Jones supplies *all* types of stock-preparation equipment . . . pulpers, beaters, conical refiners, disc refiners, agitators and screens. All types, yes . . . but only one quality — the best!

Ask your **E.D. Jones** *man first...*

E. D. JONES & SONS COMPANY

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BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

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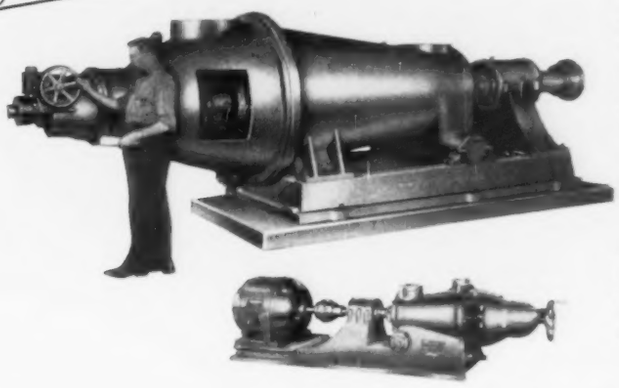
YOU CAN DO IT BETTER

WITH E.D. Jones®

E.D. Jones JORDANS



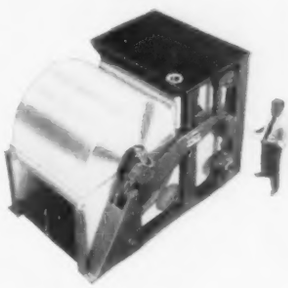
From the mighty Leviathan down to the Midget (for specialties and laboratory work) there is a Jones Jordan for every mill need. A wide variety of tackle, and a choice — on most models — of three types of plug adjustment mechanism, give Jones Jordans the maximum of control and flexibility. Ask your Jones representative or write us for Bulletin EDJ-1007A.

All Jones Jordans, for the past 15 years, have featured split small heads and self-contained bearings to permit quick and easy dismantling and assembly.

E.D. Jones HI-LO PULPER

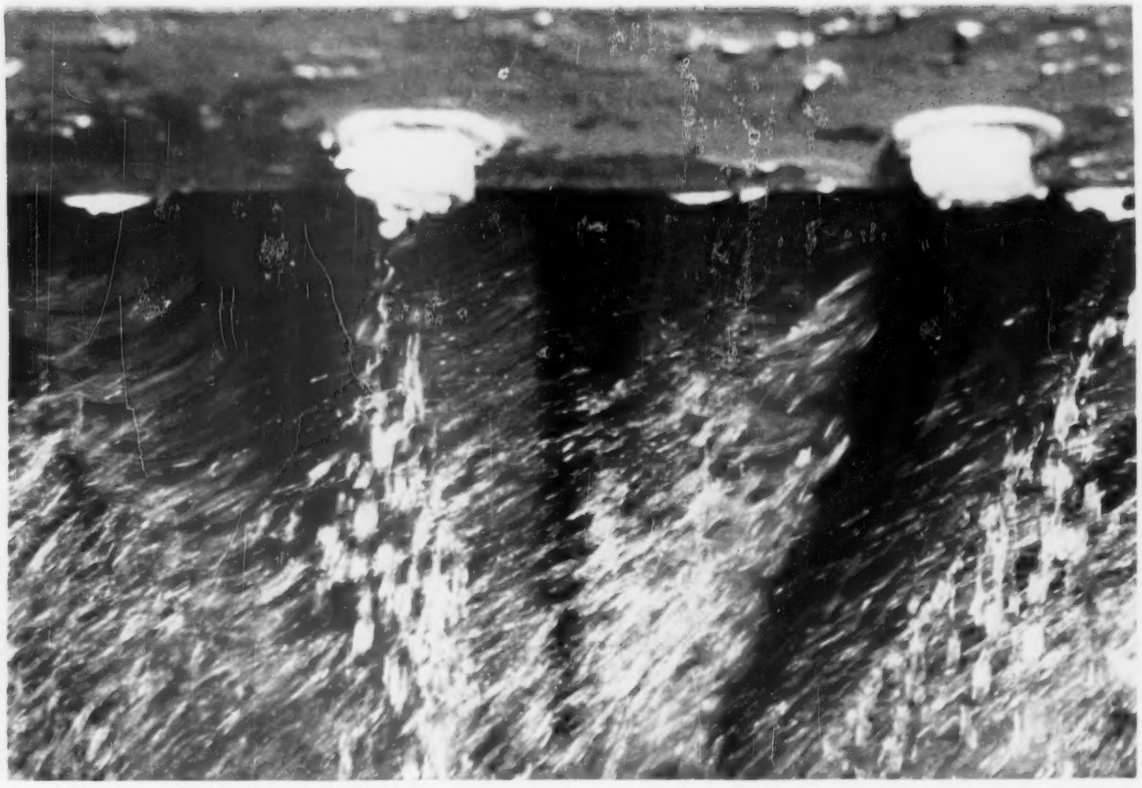
Only individual rotors, one for circulating and one for defibering — the unique feature of this outstanding Jones machine — can provide fast, complete defibering, without cutting, and with the most efficient use of applied horsepower. The HI-LO is proving this in mill after mill, even on such hard-to-treat material as waste news and wet-strength broke. Ask your Jones representative for details or write for Bulletin EDJ-1063.

E.D. Jones BEATING UNITS



A complete "packaged" unit, incorporating proven principles of Jones-Bertrams design, affording precision control, more positive and uniform treatment of stock . . . and significant savings in installation, floor space, maintenance and power. Available for tub installation or multi-beater set-up for continuous operation. For more information write for Bulletin EDJ-1079.

ITALY, de Bartolomeis • JAPAN, Mitsubishi



water shedding table rolls

mean faster, more uniform formation on the wire . . .

From the slice to the wet press a large amount of water has to be removed in a short space of time if the papermaking operation is to be efficient. To achieve this, the water draining through the wire must be thrown down and away from the web by the table rolls. Making table rolls which combine this water shedding characteristic with other features to give longer wire life is a highly developed skill at Stowe-Woodward. Ask your Stowe-Woodward Sales Engineer about the many other advantages of Stowe-Woodward table rolls in your mill.

Complete roll processing plants at:
NEWTON UPPER FALLS, MASS.
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New York office: WOOLWORTH BUILDING, NEW YORK 7, N. Y. • *On the West Coast:* HUNTINGTON RUBBER MILLS, INC., SEATTLE

A melamine resin supplied as a finely divided dry powder, Scriptite 33 imparts high wet strength to many paper products.

Count on Scriptite 33 to increase dry tensile strength and wet rub resistance . . . to improve dry Mullen, wax pick, internal size efficiency, dry stiffness. Scriptite 33 produces papers with strong fold endurance.

Call on the Monsanto Paper Resins Department for experienced assistance in formulating and testing. For laboratory samples of Scriptite 33 and technical bulletin, write Monsanto Chemical Company, Plastics Division, Room 1906, Springfield 2, Mass.

*SCRIPTITE® REG. U. S. PAT. OFF.

MONSANTO

The Monsanto Line of Paper Resins also includes:

SCRIPTITE 40 . . . *a urea type wet-strength resin.*

SCRIPTITE 50 . . . *for unsurpassed printability and improved surface characteristics on boxboard.*

SCRIPTITE 52 . . . *in combination with formaldehyde to give water resistance to folding boxboard and to jute liner.*

SCRIPTITE 54 . . . *for outstanding water resistance and both wet and dry rub resistance.*

HUYCK MAINTAINS AN

Ralph Beaumont, Huyck's Director of Chemical Research, answers a paper-maker's questions about new developments during a Huyck Felt Workshop.

"OPEN DOOR" POLICY...

One thing you'll notice whenever you visit Huyck's: there are no "secrets" concerning the felts being made for you — including Huyck's research to make them *even better.*

You will see firsthand the results of Huyck's continuing search for new and better uses for fibers. You will be told all about the latest developments in chemical treatments and be given the answers to all of the questions you've wanted to ask about felts you use.

Huyck maintains this "open door" policy, believing it is the only way to help you produce better paper — and more of it — at lower felt cost per ton.

KENWOOD TEXTILE PRODUCTS

F. C. Huyck & Sons,
Rensselaer, N. Y.;
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In Canada: Kenwood Mills Ltd.,
Arnprior, Ontario

NEW

HUYCK FELTS INDUSTRIAL FABRICS

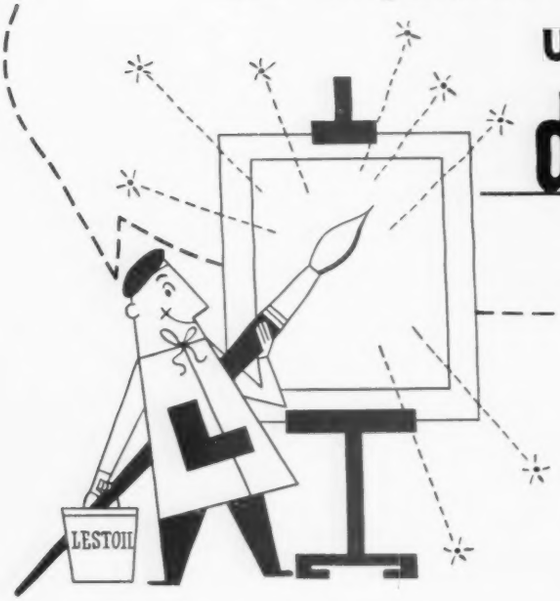
FIRST IN QUALITY • FIRST IN SERVICE SINCE 1870

for unexcelled uniformity of color and brightness in finished paper...

USE

d-i LESTOIL

LIQUID DETERGENT



Consistently high standards are maintained from stock processed with d-i LESTOIL liquid detergent.

d-i LESTOIL combines in one product thorough wetting, penetrating, solvent, emulsifying, and dispersing properties which assure complete soil removal from all types of furnish. No new equipment is necessary — d-i LESTOIL does a thorough job in rotary boiler, beater, hydropulper, washer, or head box — wherever cleansing of raw stock is a problem.

d-i LESTOIL
dissolves and disperses ink, wax, oils, asphalt coatings, fillers and other impurities from news, magazine, ledger and mixed papers.

d-i LESTOIL
aids in rapid and effective defibering.

d-i LESTOIL
dissolves and disperses wax, grease, and oils in rags, rope stock, cotton mill sweeps and cotton linters.

d-i LESTOIL
keeps washers, wires and felts — the entire system — CLEAN. Tackiness and sticking at the press or drier is prevented.

d-i LESTOIL
makes possible economical performance by reducing shut-down time.

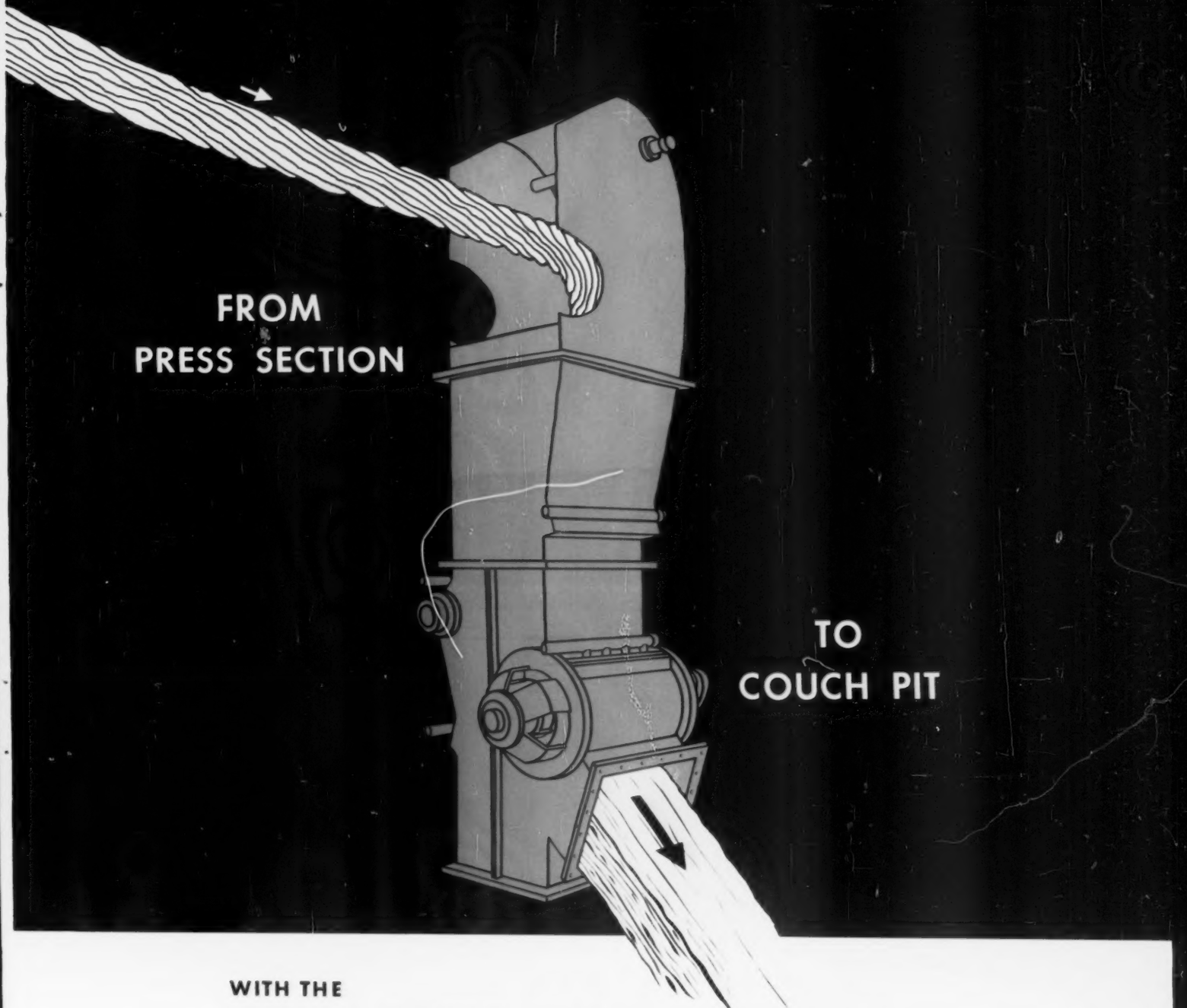
d-i LESTOIL
is unexcelled for washing felts.

Make d-i LESTOIL a "must" in your manufacturing specifications. It will assure you of trouble-free processes — and a finished product that is uniform in color and brightness, and is completely soil free.

For complete technical information and a generous free sample of LESTOIL write to:

ADELL *Chemical Company*

HOLYOKE, MASSACHUSETTS



WITH THE

IMPCO PRESS BROKE SHREDDER

Now, your press broke can be automatically shredded and slushed to the couch pit at pumpable consistence. Completely proven in a wide range of tonnages, the unit used in the above illustration is in service on a 500 T D kraft machine at 2500 f.p.m. at 32%.

Let us show you how this principle can be applied in your existing mill.

IMPROVED MACHINERY INC.
NASHUA • NEW HAMPSHIRE

In Canada, Sherbrooke Machineries Limited, Sherbrooke, Quebec

Good tip! Maybe you don't specialize in ticker tape, but if you make *any* papers for profit, put your money on Clinton starches. For internal and surface sizing, and for coating, Clinton is a sure bet. Clinton's enzyme converting starches PM-3011 and PM-3021, for example, give consistently uniform coating because they convert well at high solids levels. The unvarying high quality of all Clinton products gives you closer quality control over *your* products.

To aid papermakers, and to develop new corn refining processes and products, Clinton is now at work in a new million-dollar research center. This modern laboratory serves as "home-base" for your Clinton technical man.

. . . and remember technical service in connection with your specific problems is available without obligation.

Quality products

FROM THE WORLD'S CORN CENTER

CLINTON

CLINTON CORN PROCESSING COMPANY

CLINTON, IOWA

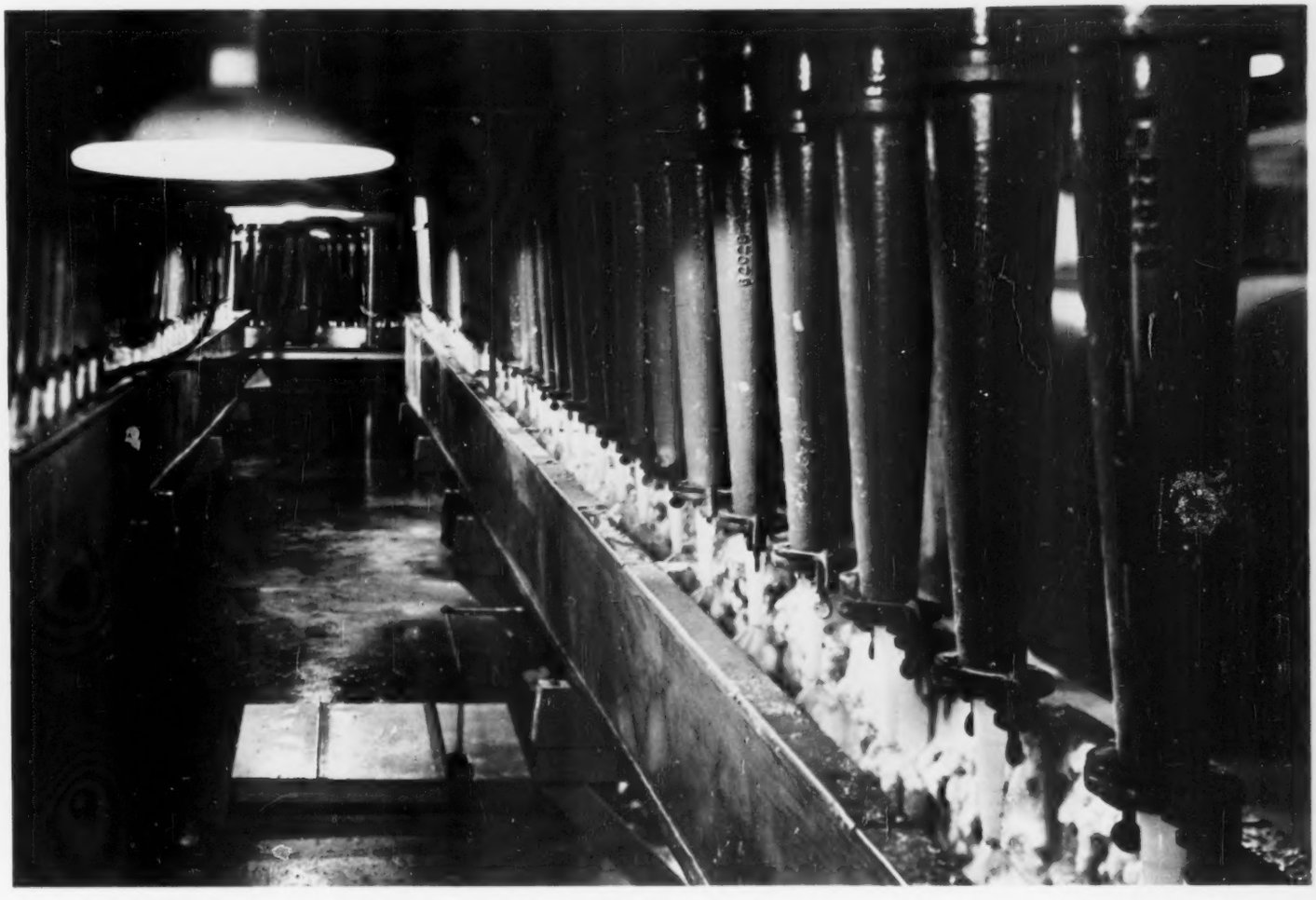


photo courtesy BROWN COMPANY, BERLIN, N. H.

WHERE QUALITY COUNTS

you'll find **BAUER CENTRI-CLEANERS** *on the job*

write for specific recommendations

THE BAUER BROS. CO.

BURT AND SHERIDAN, SPRINGFIELD, OHIO

WANT TO Reduce Operating Costs?
Increase Production?
Save Manpower?

INSTALL RUGGED DEPENDABLE FABRI DIGESTER VALVES ON YOUR WOODCHIP COOKERS

DESIGNED TO MEET INSURANCE UNDERWRITERS' SPECIFICATIONS

AUTOMATIC CONTROL

• The digester valve can be linked to all other digester valves for completely automatic control from a central station. Available with either hydraulic or electric motor operation.

Fig. 46—Fabri Digester valves furnished in stainless steel body with mild steel flanges or with any combination of materials.

FABRI-VALVE BUILDS THE LARGEST VARIETY OF PULP-STOCK VALVES IN THE WORLD

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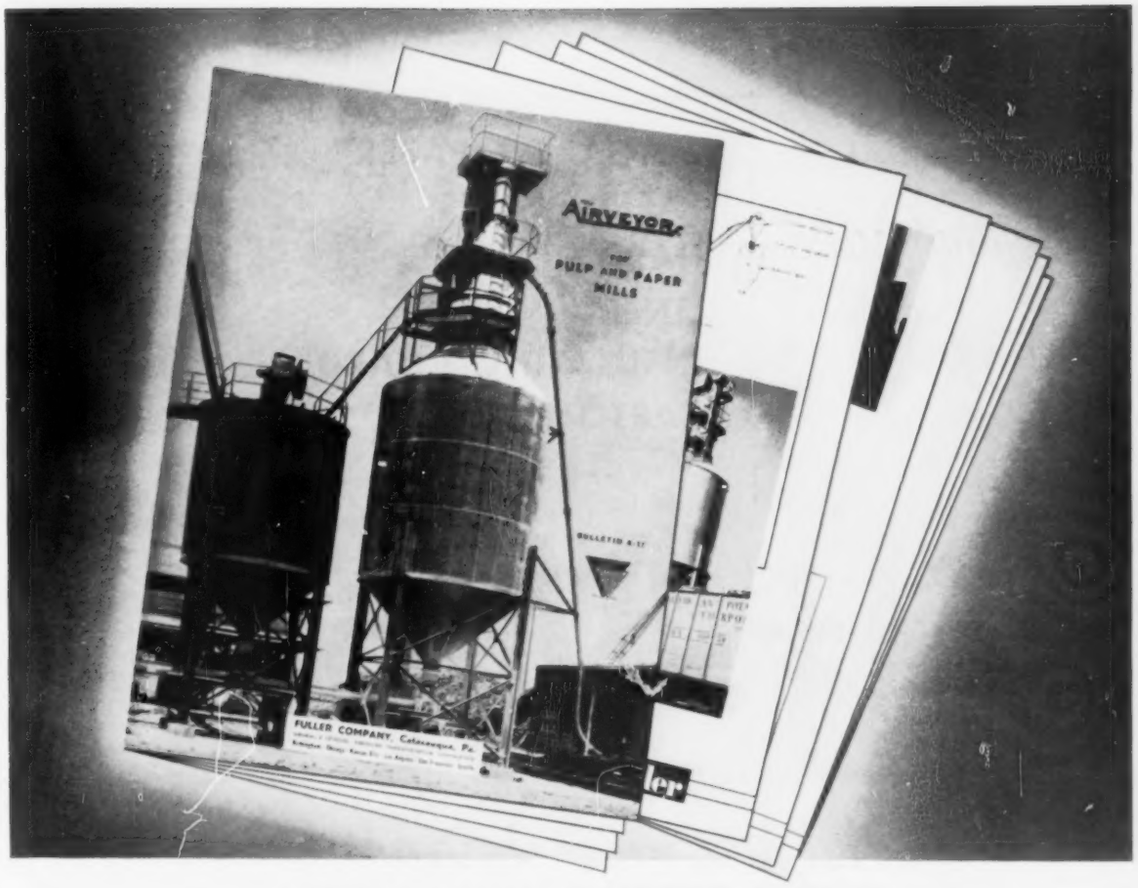

HERE'S HOW THESE 10 MILLS CUT COSTS AND IMPROVED EFFICIENCY

- East Texas Pulp and Paper Company
- Mead Corporation
- St. Regis Paper Co.
- Finch, Pruyn & Co.
- Weyerhaeuser Timber Co.
- Fibreboard Products Co.
- Riegel-Carolina Corp.
- Ketchikan Pulp Company
- New York & Pennsylvania Company
- Crown-Zellerbach Canada, Ltd.

Exactly how ten representative pulp and paper mills cut costs and improved efficiency of their conveying operations using Airveyor® pneumatic systems is told in new Fuller Bulletin A-17. It gives pertinent facts and includes schematic drawings of each installation.

See how the Airveyor, engineered by Fuller, is used for virtually automatic handling of mill process chemicals, chips, sawdust, and hog fuel. Mills throughout the United States, Canada, Mexico and South America are achieving important operating savings through its simple design and dependable operation. The Airveyor eliminates handling losses and dusty working conditions. In addition to unloading from cars and delivery to storage, the Airveyor is used to reclaim materials from storage for delivery to service bins, mixing tanks, or other process equipment.

Airveyor systems are designed and built in three general types to meet all service requirements: vacuum, pressure, and a combination of vacuum and pressure.

Fuller's more than 30 years of specialized experience in pneumatic handling of dry bulk and granular materials can bring you important savings. Write for your copy of Bulletin A-17.

See Chemical Engineering catalog for details and specifications.

FULLER COMPANY GENERAL AMERICAN

Fuller

. . . . pioneers in harnessing AIR

A-255
4269

FULLER COMPANY

128 Bridge St., Catasauqua, Pa.

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MAGAZINE PAPER
PAPER PLATES
HARD BOARD
LINER
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CARTON STOCK

Bilt-Wax®

tested wax emulsions

can improve your products

details on request

R. T. VANDERBILT CO., INC.
230 Park Avenue, New York 17, N. Y.

Forecasts—1958-1960-1965

	Total Paperboard	*Container-board*	*Bending Board*	*Special Foodboard*	*Nonbending Board*
Actual 1955	14,048	7,542	2,775	1,156	2,575
" *1956	14,403	7,823	2,889	1,256	2,435
Net Demand (Required U.S. Production) 1958	15,700	8,300	3,100	1,600	2,800
Net Demand (Required U.S. Production) 1960	16,900	8,800	3,300	1,900	3,000
Net Demand (Required U.S. Production) 1965	21,000	10,600	3,800	3,100	3,500
% Increase 1965 over 1956	46.5%	35.5%	31.5%	146.8%	43.7%

What's Ahead for 1958-1960-1965 . . . A rare forecast by Dept. of Commerce for U.S. paperboard

PAPERBOARD REPORT:

Is Boom Doomed or Will It Go Zoom?

By MAURICE R. CASTAGNE
Eastern Editor, PULP & PAPER

. . . That's the medicine which was prescribed for members of the National Paperboard Assn. on its 25th birthday, when they met at New York's Waldorf-Astoria in November. Prescribing physicians were an economist (Roos); statisticians (Wescott and Newburg) and one of the patients himself (Kennedy).

There were others on hand to talk about industrial relations, paperboard odor, chemical additives, wastepaper.

But don't get the wrong idea. Paperboard is no ailing patient. In fact, when all the figures for 1957 production are in, paperboard is expected to emerge as the hero of the year, maintaining its firm position as one of the financially sound industries of the United States.

The picture has changed from that of a year ago when late in 1956 and early 1957 the spectre of excessive consumer inventory building plagued the industry. Now it is back at its old job of maintaining its historical growth performance and setting some new production records.

And the chart and table above bode further good omens for paperboard. In themselves, they are unique, representing what is probably the first official attempt at "guestimating" by the U.S. Dept. of Commerce. It predicts a whopping 46.5% increase in required paperboard production by 1965 over 1956, to meet demand. Percentagewise, the biggest increase—146.8%—is foreseen for special foodboard.

Some Highlights of NPA Annual Meeting:

1. To keep bloom on boom requires research, selling
2. 1958 may be "if" year; depends on how board competes
3. Sets production records, but capacity is climbing
4. Research in paperboard odor is successful
5. Collective bargaining may be stiffer in 1958
6. More waste paper, but it will be harder to get
7. New rubber dunnage popular; Container Corp. likes it
8. Outlook for legislation is becoming more favorable
9. Corporate accounting contributes to inflation

1958—An "If" Year . . .

As encouraging as these figures look, paperboard men know that they face another "if" year in 1958. Has the U.S. economy reached a leveling off? If so, for how long. When will it start its upward spiral again? Will 1958 be another transition year or will it be a really good year? Some

of these answers hinge upon how well paperboard can keep its markets, many of them now being actively wooed by aluminum, plastics (especially formed plastics), etc.

But for every "if" there's an "on the other hand." The optimists seem to balance out the pessimists (or as they like to be sometimes called, the realists). For instance, NPA Statistician Al Newburg succinctly put it this way: "When you read the Goodbody report, you want to sell the industry short. When you read Stevenson's report, you want to go out and hock the family jewels to get back into the industry."

Keynote speaker for NPA's 25th meeting was President Jack R. Kennedy, president of Federal Paper Board Co., who chided the industry for "too much concern with capacity to produce and too seldom with capacity to merchandise.

"We've got to give greater thought and devote much more time and research to developing new products, new uses and new markets."

Kennedy ..... Wollenberg ..... Olsson

Kennedy Again President; Olsson, Wollenberg, V.P.'s

Jack R. Kennedy, president of Federal Paperboard Co., Bogota, N.J., was re-elected president of the National Paperboard Assn. The NYU graduate joined Federal as assistant to the president after a Wall Street career and with the copper industry, later became president in 1942.

Federal has mills in New Haven, Versailles, Montville, Conn.; Whitehall, Md.; Reading, Pa.; Steubenville, Ohio and Morris, Ill., in addition to the Bogota mill.

Sture G. Olsson, president, The Chesapeake Corp. of Virginia at West Point, Va., and H. L. Wollenberg, president of Longview Fibre Co. at Longview, Wash., were re-elected vice presidents of NPA.

Production Continues High . . .

Reporting on the industry's progress, NPA Asst. Statistician Warren Wescott reported that as in the eight weeks since the Labor Day holiday, the industry was producing at the annual rate of 15.5 million tons. "Paperboard is one of the better barometers of business activity and its increased production is significant," he said.

As reported in last month's PULP & PAPER, paperboard rang up a new record for the week of Oct. 19 with some 308,100 tons produced. Yes, agreed some onlookers, we're sure trying hard to catch up for lost time.

Touching on the ever interesting and delicate subject of capacity, Statistician Wescott said that paperboard operated at about 96% of capacity in 1955; 99% for the first half of 1956, 89% the second half, to average out 94%. As the year drew to a close, paperboard was operating at about 94% current capacity, with a cumulative capacity as at Dec. 1 at around 91%.

Containerboard production for 1957 has been at a good level, averaging around 141,500 tons per week, 2.5% below 1956, said Mr. Wescott. "If the present rate continues," he reported, "containerboard will be approximately 7,350,000 tons, second only to 1956, our record year."

Boxboard was moving along at a very good level (6,194,660 tons as at Nov. 23) and may establish a new record.

Folding grades were ahead of 1956 (2,355,649 tons at Nov. 23). Foodboard will be about 1.5% above 1956's record, would wind up around 1,265,000 tons. Set-up was struggling along at not too high a level, about 12.5% under 1956 (production as at Nov. 23 was 523,737 tons).

Paperboard's capacity to produce was around 16.8 million tons in 1957 on an "all-out" or high pressure basis, said Mr. Newburg, but it would probably produce 14.2 million tons, leaving some 2.6 million unmade. Capacity on a 6-day week basis, as used in association records would probably be 1.5 million tons.

"The year of 1959 comes up with a prospect of 17.1 million tons capacity. We had expected 18.5 million tons, but there were some plans discarded, just how much is not known at this time.

"In 1925 we produced some 3,100,000 tons. If we add 5% growth factor on a compound basis every year to that figure, we get 14.2 million tons in 1956, 15.6 million in 1958 and 17.2 in 1960."

Comparing the industry's 5% growth factor with actual production, Mr. Newburg said that starting with 3.1 million tons of 1925, the growth factor figure in 1947 was 175,000 tons under actual production; in 1953 it was under production by 250,000 tons and over actual production by some 600,000 tons in 1954. In 1955, production was higher by some 500,000 tons and 200,000 tons in 1956. In 1957 it has reached a kind of plateau, he reported.

Odor and Chemical Additives . . .

Recently the paperboard and paper industry has been threatened by restrictive legislation on these two properties. NPA has sponsored research into the isolation, analysis and chemical classification of paperboard aroma which has been highly successful, says Dr. Keith W. Max, asst. to the vice president, Continental Can Co., Inc., Robert Gair Paper Products Group. He is chairman of NPA's biological research committee.

Under direction of Dr. Ernest Reed at the Microbiological and Biochemical Research Center of Syracuse U. Research Institute, the aroma of paperboard has been isolated by steam distillation. "Although the specific identity of the aroma has not yet been determined, this discovery permits," says Dr. Max, "a study of the aroma's sources and corrective treatment." The Research Center is now concentrating on preventing and correcting aroma.

Cancer Specialist's Charge . . .

Dr. Reed pointed out that the National Academy of Sciences reports that some 800 chemicals are being added to food that "might be poisonous."

Dr. Reed condemned a speech by a cancer specialist in Rome, Italy, who indicated paraffine used in foodboard caused cancer. Countered Dr. Reed, "It has not been determined that any single environment has caused cancer. They are making a quest into reasons on environmental cancer. There is no evidence of it."

Labor Relations . . .

In industrial relations, 1957 was an unusual year reported L. A. Combs, chairman of the NPA's industrial relations committee and vice president of Container Corp. of America. Some 68 plants reported 8.8¢ an hour increase. The Bureau of Na-

tional Affairs reported that one-third of settlements were from 10¢ to 12¢ an hour. General feeling is that collective bargaining in 1958 could be stiffer than in the past.

"Let's move to a better climate," urged Tom J. Cleland, NPA's director of industrial relations. "Corruption in labor unions uncovered by the Senate Select Committee on Improper Activities in the Labor or Management Field will produce a stronger and more respected labor movement."

"With a political force of the size and potential of a strong and respected labor movement, American business had better get moving," he said. "The public must be educated on the fine works of industry—good products at reasonable prices, jobs at high wages, substantial taxpayer, supporter of charities. If business fails to tell its story to the politicians they will hear only one side."

More Waste Paper, but Harder To Get . . .

That's what Frank Block, of Frank Block Associates and director of public relations for the Midwest Consumers of Wastepaper, predicted. The lateral movement of people to suburban living and industry decentralization away from cities disperse the sources of waste paper, will make present systems obsolete or inadequate. This shift in population is forecast for the South and West further from former centers of waste paper collection and paperboard production.

Another problem is that new construction may be expected to include built-in disposal units of waste paper before it can be collected.

Mr. Block urged a re-tooling of machinery of waste paper collection, new methods of efficient handling.

Rubber Dunnage Used by CCA . . .

Container Corp. of America has shipped more than 1,000 carloads from its Philadelphia plant using Shor-Kwik, the new inflatable dunnage first developed for the U. S. Army by U. S. Rubber Co. (First reports on this technique and equipment involved were carried by PULP & PAPER in July, 1957, followed by a detailed story in the November issue).

Reporting on results was Stan H. Tippett, eastern traffic mgr., CCA. Advantages he cited were: 1, quick, easy to install; 2, cars can be more fully loaded; 3, fewer cars are needed as they can load more freight per car; 4, elimination of receiving and handling of bracing materials; 5, releases space formerly reserved for lumber. (Can store 30 rubber tubes per pallet); 6, elimination of intra-plant hauling of dunnage, and, 7, better housekeeping.

CCA likes the cost factor, too. They have had an average cost saving of $10 per car and for the 1,000 shipments have had only 9 claims for damage totaling around $1,000. Some of this was attributed to a railroad accident, so damage claims using inflatable dunnage were actually less.

Legal Events Affecting Paperboard

Malcolm K. Whyte, NPA counsel, reported that the steam has gone out of the pre-merger notification bill. There seems to be less interest in the food additive bill than when it died in the committee two years ago.

He confessed to be bothered by the National Lead Co. case which outlawed zone delivered price system.

Is Corporate Accounting Dated? .

"Accounting has failed to keep pace with our economic system in its perspective," claimed Leonard Spacek, of Arthur Andersen & Co. "Accounting methods used in preparing corporate financial reports which show unrealistic profits have substantially contributed to inflation," he claimed.

"This overstatement of profitableness whetted the appetites of labor leaders for increased wages, and of market speculators and small investors."

Mr. Spacek mentioned the handling of long-term leasebacks as current expense which fails to show long range liability and the failure to depreciate property which is actually used in operations at current purchasing power of the dollar.

What's Ahead for Paperboard . . .

By DR. CHARLES F. ROOS
Chairman, The Econometric Institute, Inc.

(Remarks at National Paperboard Assn. Annual Meeting)

Roos . . . "A fairly stable level of disposable personal income for 1958."

● The problem of discussing economic matters with you today is complicated because I am an optimist at heart. I would like to tell you that everything is all right, but it isn't possible to tell you this.

Production increased during the summer to 144% of 1947-49. Production was 141% in October.

Strength in the third quarter of 1957 was due to higher production of consumer non-durable goods and construction materials. Production of consumer durables had a mild decline. Most significant is the fact that new orders for capital goods continued to decline.

It looks as though there is a decline ahead in capital goods production. Between now and June the decrease will be a little more than 10%. The output of capital goods is currently 41 points of the total production index of 141. You are going to have to face production of 137% not many months away, probably in the second quarter of 1958.

You sell your output principally to producers of consumer goods who sell to population. Disposable personal income of this population is around $303 billion. The first interruption in the upward trend in the last several years occurred in September when this income dropped below the August rate. There probably will be further decreases in October and November.

Offsetting factors to income will be a continued rise in wages, also payments from social security and retirement funds. There will probably be only a mild reduction in dividends. Taking into account the offsets, one should look forward to a fairly stable level of disposable personal income, probably off 1% by June 1958.

Wages Will Increase . . .

By next spring (about May-end of June) unemployment will probably be in the neighborhood of 4 million. Nonetheless, wages will increase next year. In the first place unemployment affects bargaining only when it exceeds 6% of the labor force and we are not apt to reach this level until spring. Hence labor bargaining will go on in the first half of 1958 with unemployment too small to have much effect on the outcome. Under tight money policies of the U. S Federal Reserve, wage rates can be affected adversely only if unemployment is increased to a level above 6%.

The negotiation problem is going to be a very difficult one. Some increase in wage rates is almost certain to develop. The settlement will affect

other industries, including those with relatively low operating rates.

The combination of lower operating rates and a rising wage level is apt to result in fairly stable price levels and shaved profit margins. I suggest therefore that you look closely into unnecessary costs, profitability of certain products, and unprofitability of others and that you do some weeding out. If you are successful in these efforts, you should be able to do a good job of turning profits.

Consumption-Production Outlook . . .

Paperboard is being consumed at the rate of about 278,000 tons per week. We expect this use to decline by about 1% between the third quarter of 1957 and the early part of 1958.

The rate of production of paperboard is largely dependent upon several factors:

1. Successfully packaging a new product and being carried along by the growth of that new product.
2. Creating a board product where none has existed (e.g., the folding box people manufacturing soft drink and beer carry home containers).
3. Displacing other packaging manufacturers. This is frequently the hard way to gain acceptance.

It seems that for 1958 competition among the various packaging methods and the steel rack (no packages at all) is likely to be rather severe. This industry has the problem of continually getting on top of the users and pointing out that they will save so much in freight and reduce losses because the product arrives in better shape.

Folding box demand will probably decline about 2% in 1958. Net growth in this board has been somewhat less steep than total paperboard and a substantial amount of folding boxboard has been used to package consumer durable goods, production of which will decrease about 4%.

Special foodboard demand should increase about 3% which will more than offset the weaknesses in end-use demand for setup boxboard.

'Other boxboard' will probably decline about 3%. The demand for total paperboard will probably be around 275,000 tons per week average (about 276,000 tons for the first two quarters). Demand for containerboard should average about 144,000 tons per week for the fourth quarter of 1957, about the same in the first quarter, 1958 and 145,000 tons in the second quarter.

Boxboard demand will probably be at 132,000 tons for the fourth quarter, 1957, 131,000 tons for the first three quarters of 1958.

Industry Leaders Give Their Ideas of

New Pulp and Paper Products

● Development of new uses for paper is the subject of much urgent thought and work in the industry these days, in order that increased capacities now being completed will find outlets and markets. Along this line, here are some predictions Wisconsin industry leaders recently made in the Appleton, Wis. "Post-Crescent."

E. H. Jennings, president of Thilmany Pulp & Paper Co., sees ultraviolet printing by dyes highly sensitive to this light, with low-cost power coming from reactor plants. The artwork would be done without actual contact between paper and printing plates, merely by passing paper over rotary ultraviolet emitters with the design marked on them. Mr. Jennings also speculated on these "dream" products.

In industrial packaging, a "self-shroud"—two sheets of suitably treated paper sandwiching a net of prestressed elastic yarns—will be shipped under tension, keeping the sheet flat. When tension is released, the sheet will snap into a bulky pucker. It would provide tight wrapping of irregularly shaped objects.

A new method of making reinforced paper with fiber yarns may be a pattern of plastic filaments spun from extruders between two sheets of paper. Using high molecular weight polypropylene as the plastic would give a product five times as strong as the rayon yarns of 1957.

For cows, an edible silage sack could be developed—a bag in which green fodder is automatically packed in the field. The bag would be made of paper containing cattle food supplements from wood waste, an excellent grade of silage.

With the advent of supersoft glass fiber yarns, all building paper production might be converted over to glass base vacuum metalized for high thermal reflective value. Soil burial tests on these sheets show them to be still strong after ten years.

Cellulose compounded with chemicals in a molded panel could replace steel in auto bodies.

Further development of expendable products—"use it and chuck it"—will expand paper usage in many fields.

Stanton W. Mead, president of Consolidated Water Power & Paper Co., sees the day when chemicals,

pharmaceuticals, foodstuffs, industrial raw materials will be the principal products of pulp mills—and pulp will simply be a by-product. Potential products from spent sulfite liquor are resins for plastics and paints, adhesives, emulsifiers, fibers, food and drug ingredients, explosives, detergents, foam materials.

John Strange, president of The Institute of Paper Chemistry, predicts woodlands of better and hardier species—perhaps even entirely new species—grown for the particular use of the pulp and paper industry.

The mills to make all these new products will be completely automatic, according to **R. A. Peterson, president, Valley Iron Works Co.** Controls with built-in intelligence will automatically make decisions. Future manpower needs will be in programming and maintenance.

Papermaking speeds may double within the next 25 years, he says. To do so, it may be necessary to enclose the wet end and operate it under pressure, to use two wires instead of one, or to change drying methods by use of new energy sources. Beaters, jordans and refiners may no longer be needed—the pulp mill itself will impart the desired characteristics to the papermaking pulp.

And how about a paper ball instead of a glass one, to look into the future?

Participate in West Linn sessions of Pacific TAPPI

(From left) R. L. GAISER and K. F. BYINGTON, Crown Z West Linn team presents coated paper studies; D. DOUGLAS TAYLOR, of Weyerhaeuser Springfield branch, using sulfuric acid in sizing linerboard; T. C. SMYTH and E. C. MECKFESSEL, CZ Port Angeles, joint paper on newsprint Centricleaning; JOHN LARUE, F. C. Huyck & Son, on improving felt use. VINTON W. BACON, executive director of Northwest Pulp & Paper Assn., gave credit to industry's anti-pollution program.

Aids in Production of Better Coated Paper . . . .

High Speed Movies . . . Sheet Cross Sections

To accurately study detail characteristics of coatings at Crown Zellerbach Corp., West Linn, Ore. mill—which produces coated paper for *Sunset* and West Coast editions of *Life* and *Time*—required developing specialized precision techniques. Two of these were reported recently to Pacific Section TAPPI by K. F. Byington and R. L. Gaiser, respectively chemist and group leader of the plant's coating section.

A consolidated type laboratory roll coater was built with rolls having the same diameter as the machine coater, individual speed control and adjustable nip pressure. Roll facing was narrowed to six inches and the coating doctored off the last roll rather than transferring to paper.

Coating constituents and mechanical variables were studied on this unit with view to reducing spray from the down nips. The amount of spray per unit area was measured and high-speed strobe movies were taken at 5,000 frames per minute. When projected at normal speed "we could actually see what was taking place in the nip," according to Mr. Byington's report.

Coated Paper in Cross Section

A study of coated book paper in cross section, with view to correlating microscopic appearance with variations in sheet characteristics, was reviewed by Mr. Gaiser. As result of "considerable pioneering work" paper strips ⅛ by 4-in. were individually encased in wax blocks and sliced into 20-micron sections on a microtome. These were mounted on slides, dyed and microphotographed on color film.

The resultant transparencies are used to better understand basic organization of coated sheets. Apparent indications: Coating-base sheet interface is somewhat smoother, the wire-side coating thinner; felt side base sheet interface commonly rougher; starch penetration on felt side is up to about four times that of wire side and penetration is quite variable on both sides; wire side usually has greater pick strength; unsupered sheets appear rough in comparison to supered sheets.

Does Modernization Pay?

Along with replacing the open headbox with a Beloit air cushion headbox on No. 1 machine of Crown Z's Port Angeles mill, the machine was extended to accommodate a 12-ft. longer Fourdrinier wire and a two-stage Centricleaning system replaced rotary screens.

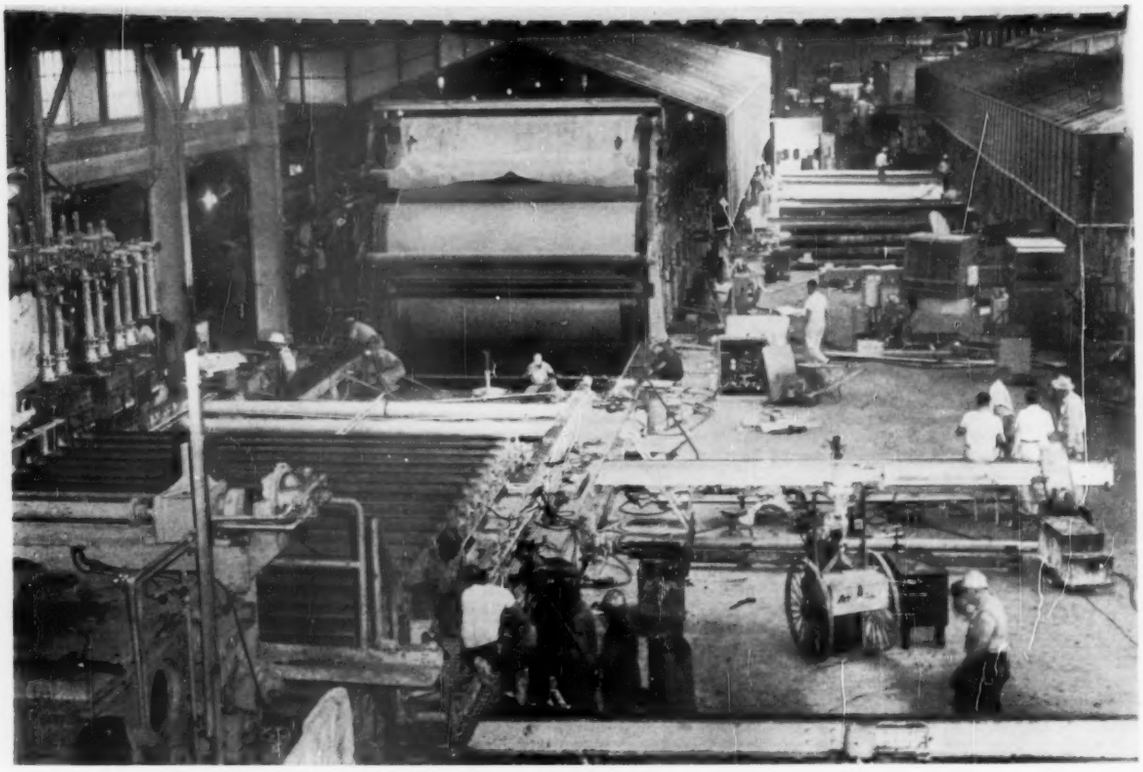
According to T. C. Smyth, technical assistant to the paper machine supt., and E. C. Meckfessel, laboratory staff chemical engineer, the Bauer Cleaners operating behind Jonsson knotters produced a "much cleaner" newsprint sheet. Besides, they point out, less evident results are even more significant. Wire life has increased 25% due to eliminating grinder grit; sulfite pulp content reduced from 19 to 16% (attributed to headbox and cleaning system); maintenance materially reduced on wire rolls, doctors and calender rolls; steam consumption lowered to ⅓ that required for operating the rotary screens; machine efficiency was upped from 91 to 94%; and "fewer shutdowns and improved efficiency has boosted production significantly."

D. Douglas Taylor, of Weyerhaeuser's Springfield, Ore. mill, reported on advantageous use of bulk sulfuric acid for lowering the pH of brown stock to 8-9 range and for automatically regulating pH of primary stock going to the 400-ton 2-headbox machine producing unbleached kraft linerboard. Alum, formerly the pH control agent, has been limited to the setting of size on fiber, 1½ lbs. of papermaker's alum rotametered into the fan pump systems per pound of dry rosin size going into the pulp.

Results from this use of both sulfuric acid and alum: (1) direct control of alum-size ratio, critical in quality sizing; (2) pitch no longer collects on equipment; (3) scale deposits no longer show up in wire pit or fan pump; (4) cost of sulfuric acid and alum consumed in machine room is half the previous cost of alum used alone.

Felt Use . . .

In discussing machine conditions which influence performance and life of felts, John LaRue, assistant field service manager of F. C. Huyck & Son, emphasized the importance of tension adjustment of felts. The best tension is progressive, the felt elongating with the sheet. For power efficiency the "tugging" effect is to be kept within specified limits and the stretch from one draw to the next should not exceed 1%.



Altering Fourdrinier Section of 216 in. "Life" Machine . . .

• More Machine Speed . . .

• Better Paper Quality . . .

• At lower cost per ton of paper

A two-year program to achieve these objectives has been completed successfully on the so-called "*Life* machine"—big No. 22—at Champion Paper & Fibre Co., Pasadena, Tex.

It is a story of careful planning, timing and close cooperation. It involved Champion executives and machine experts at the home office, and at the Carolina as well as Texas divisions. And also suppliers of equipment.

No. 22 is one of several high speed "on-machine-coating" paper machines at major paper company mills which are running day in, day out on just one product—coated stock for paper-hungry *Life* magazine. In their several companies, these are nicknamed "*Life* machines." It was only the development of high speed on-machine coating over 20 years ago that made mass circulation slick-paper magazines like *Life* possible.

Life has become one of the greatest consumers of paper in the world. The amount of coated paper it uses would wrap a 60-in. wide sheet completely around the equator every week--52 times a year. If you saw the fat *Life* issues before Christmas you can appreciate the job Champion had to do, to improve and speed up No. 22.

Project Launched in 1955 . . .

Preliminary planning for this project began in 1955. Last year it was given the green light by Champion management. Other mills, with similar equipment, from Maine to the Gulf of Mexico, were visited.

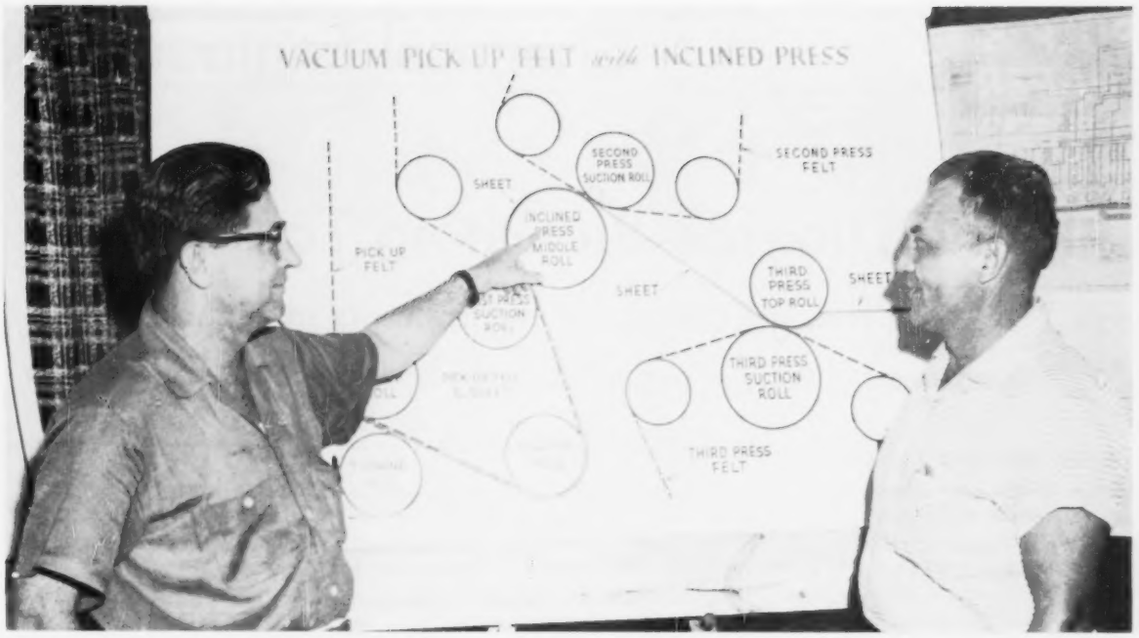
Training courses preceded the rebuild job. Last June, 82 Champion employes attended a special steam turbine operation course, as this was to be No. 22's new source of power.

About Our Cover Picture . . .

A major section of No. 22 Machine —the "Life Machine"—at Champion's Texas Division is shown on our cover. The rebuild job was virtually completed when this unusual picture was taken.

But the machine is practically obscured by about three score members of the rebuild team

Champion management emphasized the importance of the skill and teamwork and spirit of this team in getting the job done in under 12 days. At one time some 250 men were working on this machine.



Vacuum Pickup and Inclined Press for Coated Book Paper Machine in Champion's Pasadena Mill

M. L. "SLICK" LUSBY (left), who came down to Texas from Champion's Carolina Division to help, points out new features of No. 22 to JIM WITT, (right), asst. supt. of paper manufacturing, at Texas Division.

There were five orientation sessions held for crews directly connected with the rebuild and operation.

Sitting as a panel, to answer questions regarding rebuild and startup of No. 22, were Dick Betts, Jim Witt, James McAnally, Marc Kirby, Bob Forrest, Harry Pedley, M. L. Lusby, Roy Simmons and Watson Brown.

Actual Rebuilt—Under 12 Days . . .

Fourteen days were allotted for the rebuild, but it actually was completed late in September, in just 11 days, 22 hours, 40 minutes. At one time some 250 men were working on 15 separate jobs.

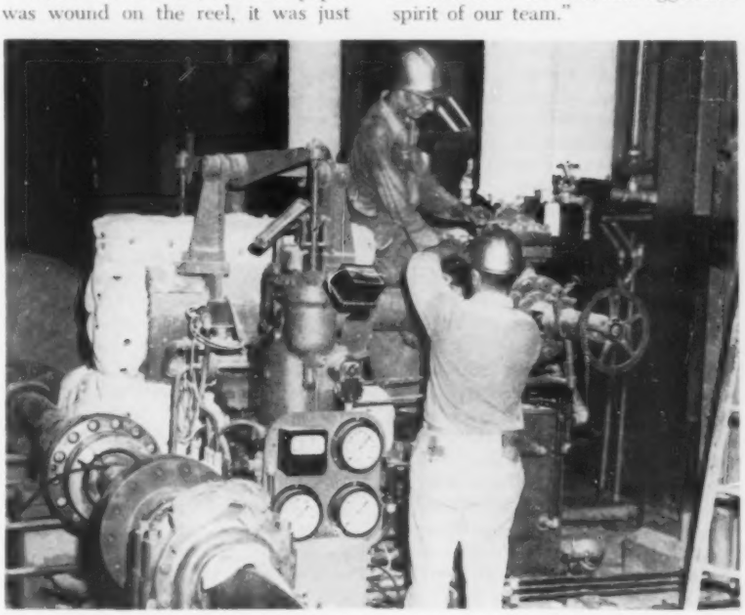
No. 22 is a 216 in. Beloit Fourdrinier. New Beloit developments for speedup and improved operation were major new features installed on the machine. These include a Beloit vacuum pickup arrangement, one of the first to go on a book paper machine. This pickup is a major factor in enabling machine speedups by reducing threats of breaks at high speeds. Beloit's inclined press and the differential line shaft drive also are now features of No. 22. Link-Belt's PIV (variable speed) units are part of the drive. The new turbine and motors are by General Electric.

Step by Step . . .

The rebuild began with removal of the old press section and preparation of the pit for the new machine press. Step by step, the job moved on, with installation of the vacuum pickup and inclined press, and then the new turbine drive. Premold concrete forms were used to prepare foundations for the differential drive. There were alterations to the Fourdrinier.

When it was done, and first paper was wound on the reel, it was just under 12 days since the job started. The startup was "the smoothest we have ever seen," said operators.

Steve Chase, vice president and manager of Champion's Texas Division, said the No. 22 job "is a milestone in Champion's progress and a monument to the skill and aggressive spirit of our team."



Working on New General Electric Steam Turbine . . .

A. J. KLECHKA and EARL POWER (back to camera) are installing this important addition for No. 22 at Pasadena, Tex.

Chlorine Dioxide Bleaching Today . . .

. . . and tomorrow – new developments in bleaching and generating ClO_2 – processes compared – cost data given

By W. HOWARD RAPSON
Professor of Chemical Engineering, University of Toronto
(Written especially for PULP & PAPER)

Major Points Brought Out by Dr. Rapson:

1. By the end of 1957, 43 pulp mills will be using chlorine dioxide on this continent, and six more are scheduled for 1958.
2. A new level of whiteness, strength and uniformity is being achieved with sulfate, soda and sulfite paper pulps.
3. Better dissolving pulps for viscose, rayon, cellulose acetate and plastics are being produced with chlorine dioxide bleaching.
4. Number of stages required for bleaching kraft pulps has been reduced to 3 or 4 for 80 to 86 brightness and to 5 for the 87 to 91 G.E. brightness range.
5. A trend is to eliminate hypochlorite altogether in pulp bleaching. The sequence chlorine, caustic soda, chlorine dioxide, caustic soda, chlorine dioxide will bleach any type of pulp to high brightness levels, with minimum color reversion while retaining strength equal to that of the unbleached pulp.
6. Several processes are now available to make chlorine dioxide at pulp mills cheaply enough to compete costwise with sodium hypochlorite.

• A yellow gas, poisonous and explosive, has revolutionized pulp bleaching in the last decade.

The value of chlorine dioxide as a bleaching agent for woodpulp has been known for 35 years. When used under right conditions it makes pulp white without lowering the strength of paper made from the pulp. However, its hazardous nature and former high cost held up its development for pulp bleaching for a quarter century.

Just at the end of the second world war, one process was developed in Canada[1] and two in Sweden[2,3] which made chlorine dioxide cheaply enough and safely enough for pulp mill use. Independently and almost simultaneously, these three processes were used in three separate companies to launch commercial chlorine dioxide bleaching in Canada and Sweden in 1946.

The first mill to use chlorine dioxide on this continent was Kipawa Mill of Canadian International Paper Co. at Temiskaming, Que. In 1950 chlorine dioxide bleaching began in Hawkesbury mill of the same company. In the same year the first chlorine dioxide plant in a United States pulp mill began operation in Natchez mill of International Paper Co. Harmac mill of MacMillan and Bloedel in Nanaimo, B.C. began to use chlorine dioxide in 1951, and Riegel Paper Corp. at its Carolina Division in 1952. Since then the development has spread rapidly, until now, in 1958, 43 mills are using chlorine dioxide and at least 7 others are committed to use it in the near future (*see Table 1*).

Since whiter pulps can now be made which make even stronger papers than before, the demand for higher brightness and better color stability has steadily increased. Purchasing agents frequently ask for 87-88 brightness with high strength, and get it. This combination was impossible economically before the advent of chlorine dioxide bleaching. Sulfite pulps can be bleached with hypochlorite to this degree of whiteness, but they are not strong enough for some purposes. Kraft pulps cannot be bleached to this level of brightness with hypochlorite, even in the best multi-stage bleach plants under optimum conditions, without excessive loss of strength.

A few pulp mills, particularly some with captive markets, have not felt the need for this higher brightness, and therefore have not yet been equipped to bleach with chlorine dioxide. However, the great majority of mills which bleach pulp for market have installed chlorine dioxide plants. Practically all new pulp bleaching mills in recent years have been designed to use chlorine dioxide (*see Table 1*).

Even higher brightness than 88 can be reached without loss of strength. Some of the most recent bleach plants can ship pulp of 90 brightness or slightly higher if required, with strength equal to that of the unbleached kraft from which it is made.

How is Chlorine Dioxide Used?

Chlorine dioxide is generated as a gas diluted with air to prevent explosion. It is continuously dissolved out of the inert gas by a countercurrent stream of water in a packed absorption tower. This dilute solution (6 to 8 grams per liter) is mixed with the pulp at as high consistency as possible (usually 11-12%), heated with steam, and pumped to a retention tower, either up-flow or down-flow, or a combination of the two.

For optimum utilization of the chlorine dioxide the retention time should be 3 to 5 hours, the pH should drop from about 7.0 after mixing to 4.5 at the end, and a positive residual test should be obtained on adding an acidified potassium iodide solution containing starch[4].

While these conditions give the best results, chlorine dioxide is such

	No. of Mills
Using or committed to use ClO_2	50
Used ClO_2 first in 1946	1
" " " " 1950	3
" " " " 1951	1
" " " " 1952	1
" " " " 1953	3
" " " " 1954	3
" " " " 1955	10
" " " " 1956	8
" " " " 1957	13
" " " " 1958	7
Reducing chlorate with SO_2	32
" " " methanol	17
" " " HCl	1
Using the Mathieson ClO_2 process	29
" " Solvay ClO_2 process	17
" " Rapson-Wayman ClO_2 process	2
" " Holt ClO_2 process	1
" " Day Kesting ClO_2 process	1
Equipped to use ClO_2 in one stage	30
" " " " " two stages	20
Using down-flow towers for ClO_2 bleaching	35
" up-flow " " " "	13
" batch equipment for ClO_2 bleaching	1
Equipped with ClO_2 for sulfate pulp	37
" " " " soda "	4
" " " " sulfite "	10

TABLE 1—Chlorine Dioxide Bleaching in North American Pulp Mills

a good bleaching agent that good results are still obtained with considerable departure from these optimum conditions. It is actually difficult not to get relatively high brightness when adequate amounts of chlorine dioxide are used. However, if the maximum possible brightness is to be obtained from the minimum amount of chlorine dioxide, that is, at lowest cost, then the optimum conditions must be strictly maintained.

At first chlorine dioxide was used in a single stage, sometimes before a hypochlorite stage[2], but usually after, as a final stage of bleaching. However, there is a limit to the brightness level which can be achieved with only one stage of chlorine dioxide for any particular pulp with any combination of other bleaching steps. It is generally found that 1, 2, or 3% higher brightness can be obtained by a second chlorine dioxide stage. By including a hot alkali extraction stage between the two chlorine dioxide stages, better color stability and one or two points still higher brightness can be obtained[6].

Bleaching Stages . . . Five or Six . . .

The modern trend in new bleach plants is to eliminate hypochlorite altogether, using only the following five stages of bleaching:

(1) Chlorination
(2) Hot alkali extraction
(3) Chlorine dioxide
(4) Hot alkali extraction
(5) Chlorine dioxide

About ten mills in *Table 1* are or will be equipped to bleach with this sequence. It has the advantage that no hypochlorite is used, which avoids loss of strength, and avoids introduction of carbonyl groups into cellulose with consequent color reversion[7].

A few mills equipped with the above five stages have an additional hypochlorite stage before the first chlorine dioxide stage, which may or may not be used[8]. This gives flexibility to the system, since hypochlorite can be included to purposely degrade the pulp when required (for example, for dissolving pulps, or for certain types of tissue). The use of calcium hypochlorite may reduce the cost by lowering the amount of chlorine dioxide required, but usually this is not the case when sodium hypochlorite is used (see cost calculations below). Furthermore, the hypochlorite may be regarded as insurance against the eventuality that the brightness reachable with chlorine dioxide alone may not be high enough.

However, the installation of a hypochlorite stage involves considerable capital expenditure. If only the five stages above are installed, hypochlorite can be included if desired by putting it into one of the caustic extraction stages. If hypochlorite is used at such high alkalinity, less color reversion is introduced.

When chlorine dioxide is to be incorporated into an existing chlorine bleach plant, each case must be considered separately. Sometimes it is possible to convert an existing tower for use with chlorine dioxide. In other cases it is advisable to build one or more new towers.

ClO_2 Bleaching Towers . . .

Chlorine dioxide is used in a few mills in batch bleaching in bellmers, in some in low density (7%) up-flow towers, and in a few others in high density (10-11%) down-flow towers, but all these have serious disadvantages.

Since chlorine dioxide is a gas, with limited solubility in water, which decreases with rising temperature, it tends to escape from the solution in bellmers or on entering down-flow towers. Since chlorine dioxide bleaches best at about 70°C. (158°F.)[6, 8], to save heat it is desirable to use high consistency, but the higher the consistency the higher the chlorine dioxide concentration and the greater the tendency to escape from the solution.

Therefore Improved Machinery Inc., introduced the pre-retention tube before a down-flow tower. At first this was 4 ft. in diameter, but more recent installations have had a 5-ft. pre-retention tube. This represented a considerable advance in chlorine dioxide bleaching. However, there is still considerable flashing of chlorine dioxide as the stock leaves the top of the pre-retention tube, sometimes making it difficult to maintain a positive residual test for chlorine dioxide at the bottom of the tower.

More recently Kamyr Inc. has installed high density up-flow towers in which the stock overflows the top into a launder ring. This has the advantage that the chlorine dioxide cannot escape from the pulp until the full retention time has elapsed. Furthermore, it is a relatively simple matter to obtain a sample at the top of the tower for determination of pH and of residual bleach. Impco and Dorr-Oliver (and possibly others) are now also offering up-flow towers for chlorine dioxide bleaching.

An argument often presented against the up-flow towers is that they cannot be used as surge tanks by operating partly filled, as can the down-

Authoritative—

Dr. Rapson Has Served 90% of Mills Using ClO_2

The stamp of authority for this article—written especially at the request of PULP & PAPER for its readers—is the fact that the author, Dr. W. Howard Rapson, has served as a consultant to 90% of the North American pulp mills now using this new, versatile bleaching agent.

In fact, Dr. Rapson's consulting career in various aspects of pulp manufacturing, especially bleaching processes, conditions and equipment, and installations and operations of chlorine dioxide plants, has involved him in work with the majority of pulp mills on this continent.

He is well known for having pioneered the earliest uses in America of chlorine dioxide. He has written numerous articles on the subject. But for PULP & PAPER readers—in this article—he sums up major points of all his published works, as well as the experiences he has had over many years.

Prof. Rapson graduated in chem. eng. and obtained his M.A.Sc. and PhD. degrees from the University of Toronto, and taught there for six years.

He then spent 12 years in the pulp and paper industry for Industrial Cellulose Research Ltd., a wholly-owned subsidiary of Canadian International Paper Co. For the last ten years of this period he was in charge of pioneering research.

His major assignment was the development of better dissolving pulps for viscose rayon, cellulose acetate and plastics, and better bleaching methods for whiter and stronger paper pulps, to all of which he made important contributions. As part of this program he pioneered chlorine dioxide in pulp mills, working out economical methods for manufacturing it, and various techniques for using it.

W. Howard Rapson

In Jan. 1953 Dr. Rapson returned as professor of chemical engineering to his alma mater, where as part of his graduate research program he is continuing his studies on chlorine dioxide. He is retained as a consultant by Hooker Electrochemical Co. in the U.S. and by Electric Reduction Co. of Canada. These companies make his services available to the pulp and paper industry in their respective countries.

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flow towers. Furthermore, the level in the down-flow towers can be adjusted to maintain constant retention time for varying pulp production rates. In the up-flow towers the retention time can be varied only by varying the consistency at any given pulp production rate. However, the temperature can be varied slightly to compensate for variations in retention time caused by changing production rate.

The advantages of the up-flow tower appear to outweigh the disadvantages, giving more efficient chlorine dioxide bleaching. The trend in more recent installations has been to up-flow towers.

Chlorine Dioxide Manufacture . . . Processes Compared . . .

Unfortunately, chlorine dioxide cannot be shipped in high concentration because it is explosive. Therefore it must be made at the pulp mill by reducing sodium chlorate in strongly acid solution with sulfur dioxide, methanol or hydrochloric acid. Six methods of manufacturing chlorine dioxide now in use have been compared by the author[10].

In 1952 a process for manufacturing chlorine dioxide by using methanol to reduced sodium chlorate in sulfuric acid solution developed by the Solvay Process Division of Allied Chemical Corp. began operation in the Carolina Mill of Riegel Paper Corp.[11] In 1953, Mathieson Chemical Co. (now Olin Mathieson Chemical Corp.) offered a process which they had developed in 1947 but kept secret[12]. This process, like the two earlier ones used on this continent (Rapson-Wayman[13] and Holst[14]) employs sulfur dioxide to reduce sodium chlorate in sulfuric acid. Both companies offered their processes to pulp mills free of royalty. *Table I* indicates the extent to which these processes have been installed by the mills.

This indicates that both these processes are convenient and safe to operate, and produce chlorine dioxide at a cost which makes it reasonably competitive with hypochlorite. Some improvements have been made in each of these processes over recent years and competition between them is rather keen.

Last year the Day-Kesting process involving the manufacture of sodium chlorate as well as chlorine dioxide in a cyclic process was installed by Brown Co. at Berlin, N.H.[15]. This year an adaptation of the Persson process was described by Columbia-Southern Corp. and offered to pulp mills[16]. The author has recently been granted a patent[17] on a new process in which sodium chloride or hydrochloric acid is used to reduce sodium chlorate in sulfuric acid solution. This process is being offered to pulp mills in the United States by Hooker Electrochemical Co. and in Canada by Electric Reduction Co. of Canada Ltd., to which the patent has been assigned in the respective countries.

Chlorine dioxide manufacturing equipment is subjected to extremely corrosive conditions, but suitable materials of construction for both chlorine dioxide manufacture and bleaching have recently been reviewed by the author[18].

Some Cost Data . . .

The capital investment for manufacturing chlorine dioxide from purchased sodium chlorate will depend largely on the desired capacity of storage facilities for the raw materials and for the chlorine dioxide produced, and on the extent of building required to house these tanks and the generating equipment. The amount expended for instrumentation and control is also a matter of some choice and is usually the next largest item of cost. The actual chlorine dioxide generating equipment is a relatively small item in most processes.

A good average figure for capital requirement for a plant for three tons of chlorine dioxide per day would be $200,000, although some mills have spent considerably less and others considerably more.

The operating cost for producing chlorine dioxide at pulp mills varies a good deal, depending on the "laid down" cost of each raw material, which varies a great deal depending on geographic location and freight rates. Therefore, no calculation of the cost of chlorine dioxide is applicable

at all locations. An example is given in *Table 2*, but the figures must be corrected by applying the laid-down costs at any particular mill.

By assuming the same efficiency for conversion of sodium chlorate to chlorine dioxide, namely, 90% of the theoretical, a comparison of the chemical costs of using sulfur dioxide and methanol as reducing agents can be made for a typical location.

Therefore, it may be concluded for the assumed prices and yields in *Table 2*, the Mathieson and Solvay processes have about the same chemical cost per lb. ClO_2 if liquid SO_2 is used, but the Mathieson process produces ClO_2 for about 2¢ per lb. less if sulfur is burned. Other factors which must be taken into account in choosing a process are not considered here, such as possibilities for improvement in efficiency, capital cost, maintenance, ease of operation, safety, etc.

The effluent solution from the chlorine dioxide generator contains sodium sulfate and sulfuric acid, which may be usable in certain pulp mills. For instance, in a kraft pulp mill if the effluent solution is introduced into the black liquor going to the recovery furnace, the sodium sulfate content can be credited, namely, 1.2 lb. Na_2SO_4 at 1.8¢ per lb. in some mills, or about 2.2¢ per lb. of chlorine dioxide. In such a case when burning sulfur for the reducing agent the chemical cost would be reduced to 17.8¢ − 2.2¢ = 15.6¢ per lb. of chlorine dioxide.

Even if 4.4¢ per lb. were added to this cost for operating, maintenance and overhead (which vary a great deal from mill to mill), the total cost of chlorine dioxide would be about 20¢ per lb. Since 1 lb. of chlorine dioxide is chemically equivalent in oxidizing power to 2.63 lb. of chlorine, this would be equal to 20 ÷ 2.63 =7.6¢ per lb. of available chlorine.

For comparison, if chlorine and caustic soda each cost 3.5¢ per lb. delivered at a mill, sodium hypochlorite would cost:

1 lb. Cl_2 at 3.5¢ (equivalent)	= 3.5¢
1.13 lb. NaOH at 3.5¢ (for buffering)	= 4.0¢
0.3 lb. NaOH at 3.5¢	= 1.0¢
	8.5¢

Since this does not include any operating cost for hypochlorite manufacture, it is obvious that chlorine dioxide is usually appreciably cheaper than the equivalent hypochlorite. Of course, calcium hypochlorite is somewhat cheaper than sodium hypochlorite.

Therefore, it may be concluded that chlorine dioxide with its inherent quality advantages can be substituted for sodium hypochlorite in most mills without increasing the cost of chemicals. Indeed, in certain locations chlorine dioxide is considerably cheaper.

Chemical	Assumed Cost Delivered	Sulfur Dioxide		Methanol	
	Cents per lb.	*Weight Required lb.*	*Cost Cents*	*Weight Required lb.*	*Cost Cents*
Sodium chlorate	9.0	1.75	15.7	1.75	15.7
Sulfuric acid	1.3	1.25	1.6	2.50	3.2
Sulfur	1.5	0.3	0.5	—	—
Methanol	5.0	—	—	0.2	1.0
Total			17.8		19.9
Note: If liquid SO_2 is purchased instead of burning sulfur, 0.6 lb. SO_2 at 4.5¢ per lb. are required and therefore 2.7 − 0.5 = 2.2¢ per lb. ClO_2 must be added to the total.			2.2		
			20.0		

TABLE 2—Chemical Cost per lb. of Chlorine Dioxide

Sodium Chlorate for ClO_2 Manufacture . . .

The rapid development of chlorine dioxide bleaching has created a new market for sodium chlorate, which has expanded rapidly in 1957, due to the large number of new bleached pulp mills which have come into production. However, chlorate manufacturers in both Canada and United States have anticipated this demand quite accurately, and have expanded their production facilities to adequately take care of all the requirements.

The expansion of pulp producing capacity has taken place faster than the market demand for pulp has increased, resulting in the current overproduction in the industry. This situation will probably cause a levelling off in the pulp mill expansion rate, giving a "plateau" for the next few years.

Chlorine Dioxide and Other Bleaching Agents . . .

Sodium chlorite in acid solution is equally as good as chlorine dioxide for bleaching pulp to high and stable brightness without loss of strength[4], but it cannot compete in cost, since it must be made from chlorine dioxide made from chlorate in the first place. Peracetic acid is almost as good as chlorine dioxide[4], but its cost at present is also prohibitive. Permanganate and ozone are effective bleaching agents, but they degrade the pulp so seriously from a strength point of view that they are not likely to be used.

Peroxide, either hydrogen or sodium, has an important place in pulp bleaching. It has the special advantage that it confers stability to the pulp against yellowing with age. If it is used as a final stage after the most effective bleaching possible has been accomplished with other bleaching agents, it will improve brightness stability, and may give 1 to 3% higher brightness. In fact, chlorine dioxide followed by peroxide is a very good combination, as shown by Casciani and Storin[19].

However, peroxide has certain characteristics which limit its application. It will not raise the brightness from low levels to high levels in one stage, say from 68% to 88%, as chlorine dioxide will. It causes some slight loss in strength, which is greater when larger amounts are used, while chlorine dioxide when properly used causes very little degradation. When used in bleaching sequences which do not include chlorine dioxide, peroxide does not raise the brightness to the high level that chlorine dioxide does, even disregarding the loss of strength involved with hypochlorite and peroxide.

The advantage of improved color stability obtained with peroxide can be obtained by using chlorine dioxide and omitting hypochlorite in the five stage bleaching sequence described above. Furthermore, just as high, or even higher, brightness can be obtained by using larger amounts of chlorine dioxide without peroxide[20]. Therefore the decisive factor in whether or not peroxide is to be used along with chlorine dioxide is the relative cost of including it or omitting it. Calculations by the author and by several research laboratories in different pulp mills independently have consistently shown the cost to be higher for the same quality when peroxide is included at present chemical costs. If the relative costs of the chemicals should change, it may become economical to use peroxide

along with chlorine dioxide.

Treatment of bleached pulp with sodium borohydride improves color stability very greatly by reducing carbonyl groups in cellulose to hydroxyl[7]. Chlorine dioxide followed by sodium borohydride produces a very white and stable pulp without loss of strength. At present the cost of the borohydride is far too high to use it, but so was that of chlorine dioxide when it was first proposed for pulp bleaching.

Can Replace Chlorine . . .

Chlorine dioxide can entirely replace chlorine for bleaching all qualities of pulp. The extent to which chlorine dioxide will replace chlorine and hypochlorite, in fact, depends upon economic rather than technological factors.

Although it is not yet widely known, chlorine dioxide can replace chlorine in the first stage of bleaching quite effectively. It can actually be used under the conditions of low temperature and low consistency normally used in chlorination[21]. However, it is even more effective with less chlorine dioxide if it is used in the first stage at high temperature and high consistency under the same optimum conditions described above for the later chlorine dioxide stages.

There is a slight advantage in paper strength in using chlorine dioxide in the first stage, the extent of which will vary with the process used and the wood species, as well as with the conditions normally used for chlorination, such as temperature, which may be rather high and destructive in many parts of the South. It may amount to 2 to 5% for kraft pulps. However, this advantage is so slight that whether or not chlorine dioxide will replace chlorine in the first stage is largely a matter of relative cost.

The amount of chlorine dioxide required in the first stage is usually much less than the equivalent amount of chlorine, since the chlorine dioxide is not wasted in further chlorination or oxidation of lignin already made soluble, and little or none is lost by reaction with the carbohydrate components of the pulp.

A new development in bleaching is the inclusion of a small amount of chlorine dioxide in with the chlorine used in the chlorination of pulp to prevent the viscosity drop which normally occurs in this stage. A patent has been applied for on this by Brown Co. It is understood that several other mills also have been experimenting with this use of chlorine dioxide[22].

In *Table 3* are some data obtained in the author's laboratory which indicate this effect. An unbleached western hemlock kraft pulp was chlorinated at 3% consistency, at 25°C., for 1 hour, with 7% chlorine on pulp plus the amounts of chlorine dioxide shown. All pulps were washed and treated with 2% NaOH on pulp, at 15% consistency, at 60°C., for 2 hours.

% ClO_2 on Pulp	Tappi Permanganate Number	Tappi 0.5% C.E.D. Viscosity, c.p.
0.00	5.0	13.9
0.01	5.0	14.1
0.05	4.5	18.1
0.10	4.5	19.3
0.20	4.3	18.3
0.50	4.3	16.8
1.0	4.1	15.4

TABLE 3—Chlorine Dioxide along with 7% Chlorine in Chlorination of Western Hemlock Kraft Pulp

Grades of Pulp and Chlorine Dioxide Bleaching . . .

1. High-White, Strong Kraft Pulps

At present, by far the major use of chlorine dioxide is for bleaching kraft pulps to high brightness with minimum strength loss.

This application is so widely accepted today that nearly all market high-white kraft pulp will be bleached with chlorine dioxide in the very near future. For captive bleached kraft pulp the competitive urgency for higher brightness is not as great, but even in this field some are using chlorine dioxide for the strength advantage, as well as for higher brightness.

2. Bleached Sulfite Paper Pulp . . .

Chlorine dioxide has less advantage over hypochlorite with sulfite pulp and therefore its use has not advanced as fast for this grade. At present about ten mills in *Table 1* are or will be equipped to bleach sulfite paper pulps with chlorine dioxide, but many of them make dissolving pulp most of the time.

For sulfite pulps the advantages of chlorine dioxide are: (a) higher brightness without loss of strength if required, (b) better uniformity of strength, and (3) easier control of brightness level. Since relatively small amounts of chlorine dioxide are required, and since the cost of using it are almost nothing because it displaces some hypochlorite, it may be expected that gradually most sulfite mills will incorporate chlorine dioxide into their bleaching sequence.

A special application of chlorine dioxide is in place of chlorine in the first stage of bleaching to aid in removing resin, especially with hardwood sulfite pulps[18].

3. Sulphite Pulp for Cellulose Acetate . . .

Most woodpulps for cellulose acetate are now bleached with chlorine dioxide. It permits bleaching the highly purified sulfite pulp without lowering the viscosity and gives better color in the cellulose acetate.

4. Pre-Hydrolyzed Sulfate Viscose Pulps . . .

It is very difficult to bleach this type of pulp to the same level of whiteness as the sulfite dissolving pulps. Furthermore, the demand at present is for pulps of higher viscosity to make stronger tire yarn. The viscosity can only be maintained at the high level required by bleaching with chlorine dioxide. Therefore, all pulps of this grade on this continent are bleached with chlorine dioxide.

5. Sulfite Viscose Pulps . . .

These pulps are relatively easy to bleach with hypochlorite, and since they must be degraded under strict control in any case, to produce pulp of constant viscosity, the use of chlorine dioxide with this grade has been slower to develop. However, nearly all mills producing this type of pulp are now equipped to use chlorine dioxide and the number of qualities in which it is used is increasing steadily. It gives better rayon color and whiter molded plastics in which this type of pulp is used as filler.

6. Low Brightness Bleached Kraft Pulp . . .

At first sight it would seem that chlorine dioxide would not be used for pulps between 65 and 82 brightness. However, several mills are now bleaching food board pulp with chlorine dioxide, and at least one is bleaching the long fibred kraft pulp for newsprint with chlorine dioxide. For such grades it has the advantage of

bleaching entirely without loss of strength and makes it possible to achieve more uniform brightness, and when required, a higher brightness level. Although chlorine dioxide costs more than lime bleach, it is just as economical as hypochlorite in mills using soda bleach. Furthermore, in new bleach plants it requires less capital investment, for fewer stages of bleaching can be used for 80 to 83 brightness. Only four stages, including one stage of chlorine dioxide are required, compared with six or seven for hypochlorite bleaching. In mills where part of the pulp is bleached to the lower brightness level and part to the highest quality market pulp, it is particularly advantageous to use the five-stage sequence without hypochlorite, taking the lower brightness pulp out of the first chlorine dioxide stage and allowing the remainder to continue through the final caustic and chlorine dioxide stages.

7. Bleached Semi-Chemical and Other High Yield Pulps . . .

Chlorine dioxide is equally good for bleaching pulps of this type, but at present it is not being used. One reason is probably that such pulps are all captive at present. When higher strength and higher brightness are required, and especially when bleached semi-chemical pulps are marketed in a competitive manner, it is highly probable that chlorine dioxide will be used, especially in situations where the cost is very close to that of hypochlorite.

References

1. Rapson, W. H., Pulp and Paper Mag. of Canada, No. 5, p. 92 (Apr. 1954).
2. Holst, T. G., Svensk Papperstidning, 47:537-546 (1944)
3. Persson, S. H., U. S. pat. 2, 376, 935 (1945) to Aktiebolaget Duba.
4. Rapson, W. H., TAPPI, 39:284 (1956)
5. Rapson, W. H. Can. pat. 470, 478 (1951); U. S. Pat. 2, 587, 064 (1952)
6. Rapson, W. H., Southern Pulp and Paper Mfgr., No. 5, p. 84, 1955; Paper Industry 10, 998 (1955)
7. Rapson, W. H., and Hakim, K. A., Pulp and Paper Mag. Can., July 1957, p. 151.
8. PULP & PAPER, No. 10, p. 54, Sept. 1957; Pulp & Paper, No. 11, p. 78, Oct. 1956.
9. Sihtola, H., Hentola, Y., et. al. Svensk Papperstidning, 60:412-419 (1957)
10. Rapson, W. H., TAPPI, 37: 129 (1954)
11. Schuber, J., and Kraske, W. A., Chem. Eng. 60, 205, (1953).
12. Woodside, V., and MacLeod, K. S. Paper Trade J. (Aug. 21, 1953)
13. Rapson, W. H., and Wayman, M., U. S. pat. 2,481,241(1949); Can. pat. 406,815, (1950) to Canadian International Paper Co.
14. Holst, T. G., U.S. pat. 2,373,830 (1945) to (Mo och Domsjo A. B.)
15. PULP & PAPER, No. 6, p. 81, June 1956.
16. Conrad, P., paper at Summer Meeting, Tech. Section, C.P.P.A., Saranac Inn., N.Y., June 1957.
17. Rapson, W. H., Can. pat. 543,589, July 16, 1957
18. Rapson, W. H., Pulp and Paper Mag. Can. (in press)
19. Casciani, F., and Storin, G. K., TAPPI, 33:588-94 (1950)
20. Rapson, W. H., unpublished data.
21. Rapson, W. H., Pulp and Paper Mag. Can., Sept. 1956, p. 147
22. Private communications

New Papermaking Equipment Described

A new vacuum former, already in use on the Pacific Coast for tissue and towel, was described by Carl Swartz, Beloit Iron Works, at the November fall meeting of the Michigan Supts. Division in Kalamazoo. (See PULP & PAPER, Sept. 1956, "CZ's Little Machine," and April 1957, "A Major Change in Papermaking" for stories on this development.)

Otis Witworth, of Black-Clawson Co., described its new differential drive, and Jack Moss, Rice Barton Corp., discussed the trailing blade coater, Gardner high velocity dryer and worm gear dryer drive, which are R-B developments. (see PULP & PAPER, Dec. issue, p. 57 for full report on latest uses of trailing blade coater and Gardner dryer).

"A remarkable increase in paper machine speeds and widths in recent years has been more a process of evolution than revolution," said Mr. Swartz. "The pressure headbox and the suction pickup on the press section are among the more important break-through developments.

"Basically," he said, "the Beloit suction forming equipment consists of a variation of the Beloit air pressure headbox delivering stock for formation on a suction type roll. A board mill is equipping an entire cylinder machine with such equipment. The former produces a sheet in which the tensile in cross and machine directions are essentially equal. It has complete operator control and clear, unstreaked formation."

"The Black-Clawson drive," Mr. Witworth said, "gives accurate speed, a 10% draw adjustment, inching forward or reverse and slack take-up with instant return. Various methods of control were tried and a hydraulic system finally decided upon. The drives are made in 150 and 300 hp. sizes and some will be put in service early in 1958."

Mr. Moss said a feature of the trailing blade coater is that hills and valleys in the paper tend to be levelled off by the coating, producing a better printing surface with less coating. The coater can be operated over a wide range of speed, with high solids and no license or royalties are involved.

The Gardner dryer covers 160° of a conventional dryer; and, by using high velocity air, increases the drying rate three or four times.

Swartz . . . Moss

Thomas E. Moffit, President Hooker Electrochemical Co.

Starting in sales at Tacoma, Wash., Hooker plant in 1930, Mr. Moffitt worked up to Tacoma works mgr. and later vice pres. in charge of western operations. He moved to Niagara Falls, N.Y., as exec. vice pres. of the company in 1956. He is also pres. of Niagara Brine Co. and vice pres. of Hooker Chemicals Ltd., No. Vancouver, B.C., and Solar Salt Co., Salt Lake City, and director of all four companies. He was born in Wallace, Idaho, and graduated from Cornell in 1922. He engaged in engineering in the Pacific Northwest before joining Hooker. Bjarne Klaussen, former pres. of Hooker, retires after serving one year beyond retirement age of 65. R. Lindley Murray continues as board chairman. Ansley Wilcox 2d was elected vice pres., continuing as secy. and counsel. Thomas F. Willers was elected vice pres. and treas., continuing as comptroller.

Quality Paper from Sugar Cane Fiber—An exclusive report on . . .

Valentine: A Study In Upgrading

Once a technical outcast among pulp fibers, future of bagasse looks bright, thanks to success of this venture

By WILLIAM F. DIEHL JR.
PULP & PAPER's Southern Editor

● South from Baton Rouge to the cocoa-colored junction of the Mississippi and the Gulf of Mexico sprawls one of the lushest areas in the United States. It is Louisiana's sugar belt, ribboned with bayous, populated with French descendants, many of whom still speak the old language, and freckled with solitary, bobbing oil wells, "ca-chunking" endlessly as they pump a fortune from the bowels of the earth.

Almost dead in the center of this colorful land of cajun and cane stands the Valentine Pulp & Paper Co., at Lockport, La., only bagasse paper mill within the continental limits of the U.S. and, just four years ago, a set of plans in the drafting room of Brown & Root, Inc., worldwide engineering firm with headquarters in Houston, Tex.

Today, Valentine is producing a high quality bleached paper from pure bagasse pulp. Stationers are presently selling this product in areas like Atlanta, Ga., a new market for this type of paper. Valentine stock is currently being converted into writing papers, printing stock, tablet, offset, mimeograph, duplicator and other fine papers.

Paper from bagasse—what is left after sugar is taken from sugar cane—has been produced experimentally for close to a hundred years, and commercially in South America, South Africa, the Philippines, Formosa and other places for the past twenty. The significance of the Valentine operation lies in the fact that an ingenious American group combined efforts to produce paper which is competing with papers made out of wood fiber.

Valentine's experts are frank to admit that when they began their "noble experiment" in southern Louisiana there were some question marks. They expected initial quality of the paper to be low, planned to produce lesser grades. Originally the mill was planned as a producer of newsprint substitutes. But after selecting Perkins-Goodwin as their exclusive sales agents, and as long as wood was in plentiful supply, it was realized it would be more suitable to move from newsprint substitutes to higher quality papers.

Valentine killed its bugs more quickly than was anticipated. In the past 18 months, Valentine has undergone a period of upgrading. No other bagasse paper mill in the world is making quality paper in such tonnages as this mill—only a few are even in the quality paper field.

Upgrading the Grade . . .

Soon after Valentine began producing paper in July, 1954, it had swung from news to low quality writing paper and printing grades. From there it progressed to school tablet and adding machine, then to machine, mimeo and duplicating papers. Now it is on multicolor printing papers and offset in large quantities.

Valentine stock has been and is being used in a variety of ways. It has been used to print *Arizona Highways*, a magazine noted for its exceptional use of color photography; for *Gun Digest*, the *Sugar Bulletin* and *Riders Digest*, a weekly paper published by the New Orleans transit system.

Although originally designed for 50 tons a day, the 24-hour periods in which more than 70 tons are produced are becoming more and more frequent. Currently the mill is on a 60-ton-a-day, 24-hour, seven-day-a-week operation. In the beginning Valentine's was a story of sweat and strain, not unlike the story of the early days of the Southern kraft industry.

One major early problem was pulping. Abrasiveness and brittleness in the sheet produced some big headaches. Today these are almost nonexistent and attention has been directed toward increased quality. Just 18 months ago, pulp brightness was low. Now it is in the 77-80 range and it can run higher as the market demands.

With production increasing steadily, the mill's demand for bagasse is beginning to exceed supply in the immediate vicinity and it will have to reach out a little farther to get its raw material. But tonnagewise it is at a disadvantage since it now finds itself competing with 400- and 500-ton-a-day giants.

Price Advantage . . .

Valentine's one big advantage is the price of bagasse, which is based on its equivalent value as a fuel. Sugar mills absorb the cost of harvesting and transporting the crop to the mill. Once sugar is removed, the prime value of bagasse is as a fuel. To obtain it as a fiber, the mill need only beat the existing price of fuel oil or gas and over the past 50 years, the price of fuel oil has remained very stable (average price: $3 bbl.). This is a most attractive feature when compared with the price of an acre of pine timberland, which has risen from $10 to as much as $125 in some places in the South.

How Valentine Was Born . . .

Valentine began with a process developed by Edward L. Powell, specialist in paper and cellulose manufacture with a background long in papermaking. After experimenting for several years with this bagasse pulp process, Mr. Powell took the idea to the engineering firm of Brown & Root, Inc.

This was not the first time the engineering company had been approached to build a bagasse mill. Foreign companies had suggested the venture before. But the Houston firm decided Mr. Powell's ideas were technically sound and economically feasible. They found a willing collaborator in Valentine Sugars, Inc., owners of a 2300 ton sugar factory in Lafourche Parish, a few miles south of Lockport and about 50 miles south of New Orleans. It was natural that Valentine Sugars and its subsidiary, Valite Corp., should show an interest in the idea. Will J. Gibbens, president of Valentine Sugars, and T. R. McIlhenny, vice president and technical director of Valite, had for 12 years been developing sugar by-products in an attempt to upgrade the use of bagasse. Among these was a patented process for producing bleached paper.

Construction of the $5 million plant, a joint enterprise between Brown & Root and Valite, began in July, 1953, using standard equipment supplied by recognized manufacturers. Brown & Root's previous experience included the pushbutton U.S. Gypsum mill in Houston and engineering and construction of two major expansions at Southland Paper Mills, Inc., Lufkin, Tex.

The first paper was produced a year later and by Aug., 1954, Valentine Pulp & Paper Co. was operating on a continuous schedule.

Men Who Run the Mill . . .

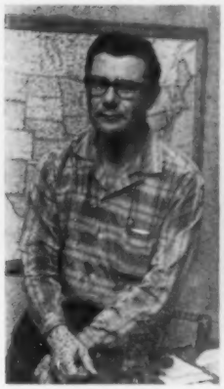
Carefully picked men are in charge of operating this mill. Ed Powell, now a vice president of Valentine, keeps close touch with W. S. (Bill) Osgood, who had been Brown & Root's project manager on the Southland expansion jobs and is now in charge of the Valentine operation. Mr. Osgood, a graduate of Iowa State University, has been with Brown & Root since 1942 on construction projects all over the world and has been with Valentine since 1956.

Mill Mgr. Warren Girard, a native of Wisconsin who attended the Institute of Paper Chemistry, was formerly with Hawthorne Mills in Kalamazoo and the Peavey mill in Ladysmith,

These are Men Who Run Mill . . .

W. S. Osgood

Arabie, left, and Toups



Girard

Hendrix

Bullock

Sullivan

Jones

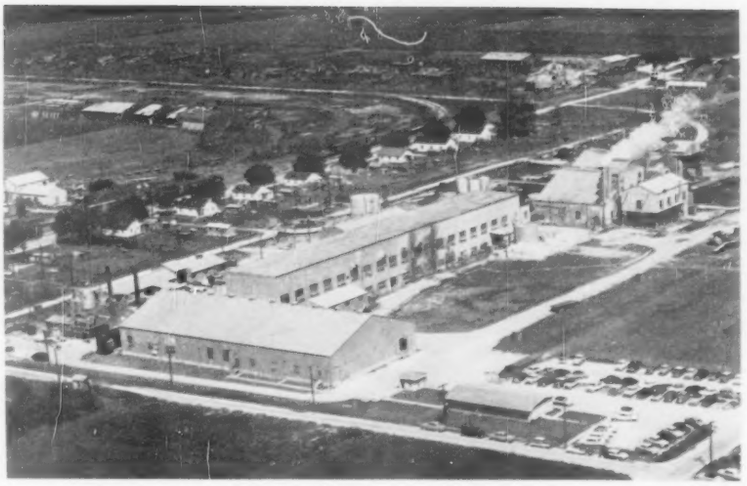
Wis. Walter Hendricks, paper mill supt., came to Valentime from the Herty Laboratory in Savannah where he was director several years. Pulp mill supt. Talmadge Bullock was with East Texas Pulp & Paper before coming to Valentine and before that was with Fibreboard Products, Inc., at Antioch, Cal.

Ed Arabie, chief chemist and tech. dir. is a 1950 graduate of LSU and a native of Lafourche Parish. He worked with Valite for three years and was in on the development of the process used in the paper mill. Al Toups, procurement mgr., is a local man and Troy L. Sullivan is office mgr. and purchasing agent.

Proof is in the Pudding . . .

Since its beginning, Valentine has had to prove itself time and time again. Envelope manufacturers, for instance, were skeptical ("It will have poor folding qualities") until Valentine produced envelope stock which was most acceptable. "Show us what you are using and we'll make an equally satisfactory product," was Valentine's challenge. To back it up, it has even made creped tissue and towel stock from bagasse.

In the past two-and-a-half years, about $10 million worth of bagasse paper has been produced from this mill. Several thousand tons of this has gone to the U.S. Government Printing Office and it is interesting to note that on some specifications for printing paper, a onetime regulation calling for paper made of "wood fiber" no longer exists.



Valentine mill sits in heart of nation's sugar belt

As proof that Valentine is in the race to stay, construction is still going on under direction of Brown & Root's Cliff Jones. It is aimed at increasing the efficiency of bagasse handling and preparation and it is significant that these new facilities are designed to handle twice the present capacity of this mill.

How Fine Paper is Made from Bagasse

1. Modified Alkaline Cook
2. Washing—3-Stage Bleaching
3. Refining—Forming Sheet
4. Water and Effluent Systems
5. More Push Buttons

"We have no secrets here at Valentine," said Gen. Mgr. W. S. Osgood. "We're making a highly bleachable pulp out of pure bagasse and the process is simple."

At the sugar mills, once the sugar has been removed from the cane, the resulting bagasse is weighed and baled in machines especially designed for this purpose. Bagasse is conveyed into a baling shed on Link-Belt conveyors over a Fairbanks-Morse weightometer. The bagasse drops through chutes to the baling machine and from there, on a drag conveyor, it is delivered to a shipping dock.

Leftover bagasse is picked up by a flight drag conveyor from a Link-Belt screw conveyor and recirculated through the system. Since cane is harvested only during certain periods of the year, it is stored outside under corrugated steel covers and then transported to the pulp mill by rail or truck. During the off season, the machinery is broken down and cleaned.

At the mill, the baled bagasse looks much like bales of hay. The wires are broken off by hand and the bales are conveyed over a Merrick continuous scale to a bale breaker and then are blown by fan to hoppers some 70 ft. away.

1. A Modified Alkaline Cook . . .

Link-Belt rubber conveyors carry the bagasse through a primary screening to six (14 ft. 6 in.) spherical Wyatt digesters used for the cook. Cycling is automatic using Fischer & Porter controls.

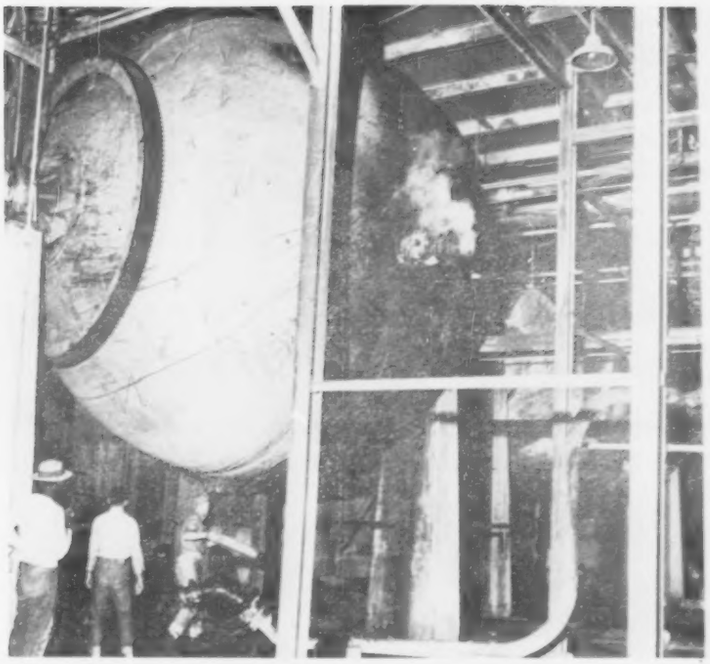
The cook is alkaline and lasts for varying times, depending on the grade being produced. There has been speculation that if and when Valentine puts in a No. 2 machine it may go to a kraft cook with recovery unit. Tests have shown, however, that gain in strength with the kraft process is much less with bagasse than with wood fiber and since Valentine is now meeting strength demands it is questionable whether the switch to kraft would justify the odor problem and the cost.

2. Washing—3 Stage Bleaching . . .

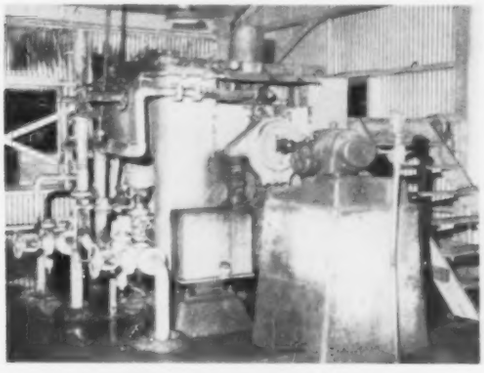
From the digester blow tank, pulp goes through a screw press for washing and then to stock storage at low consistency. Initial screening is by Impco Lindblad screen and accepts from the Lindblad go directly to

Valentine Picture Tour

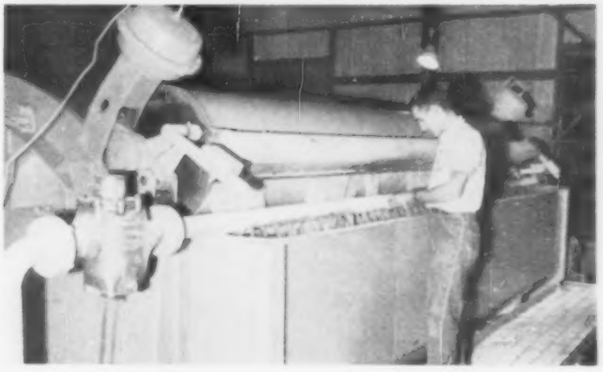
Bagasse goes to bale breaker and is then blown to hoppers



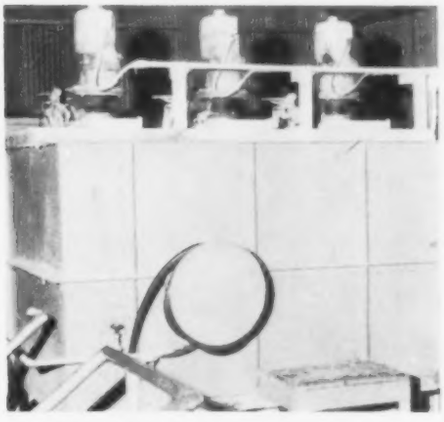
Bagasse begins evolution into paper in six big Wyatt spherical digesters



Stock is screened on Lindblad screens . . .

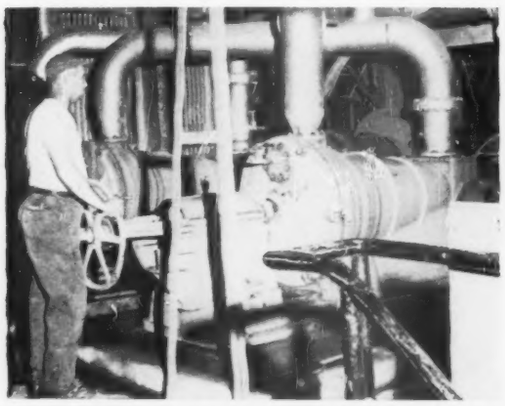


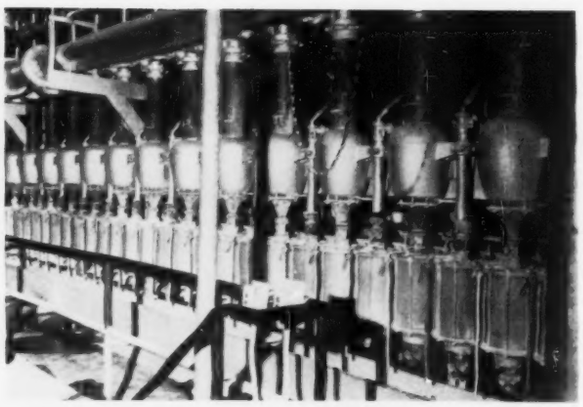
Deckers and washers are Impco valveless type



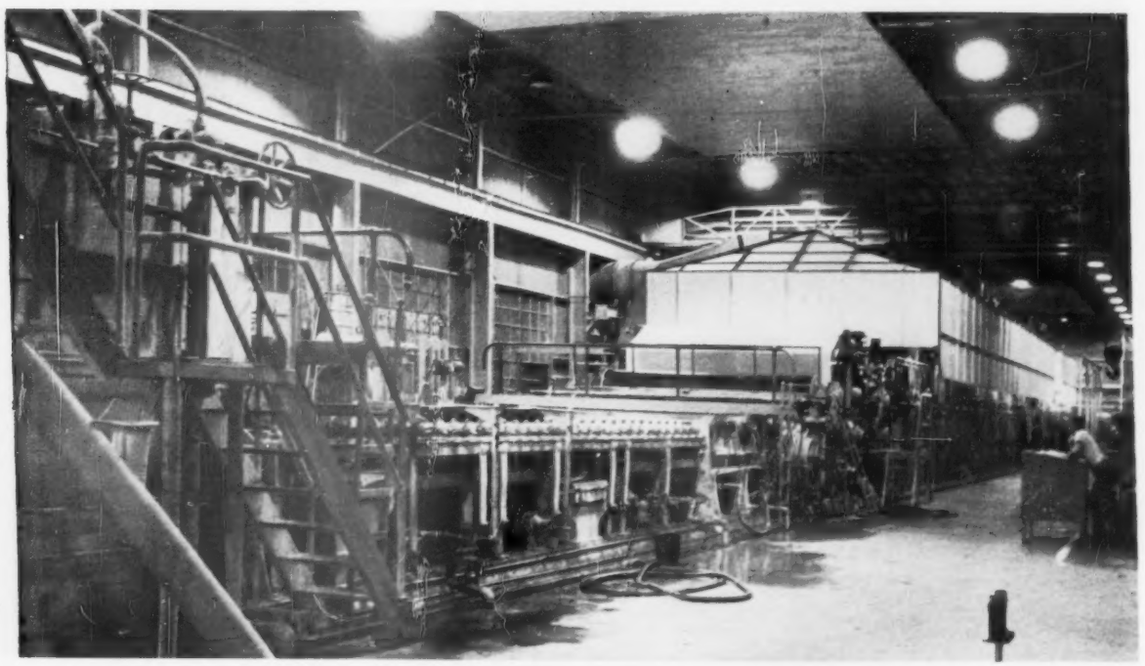
Bleached stock is proportioned here . . .

With broke from Dilts beater

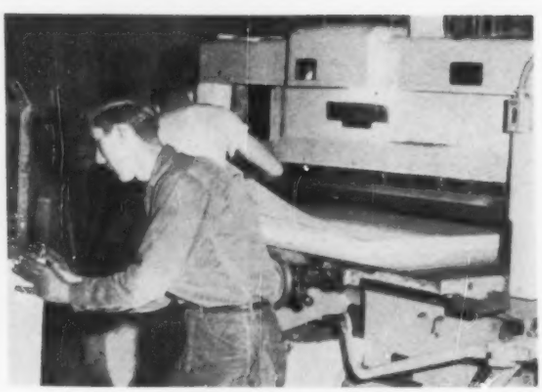




Stock is refined in two Miami No. 1 jordans . . . And cleaned in 13 Dirtecs cleaners



On this 134 in. Bagley & Sewall machine, Valentine makes quality papers



Finishing Supt. DeVille checks sheet on Rottocutter . . . Before it is trimmed on Seybold cutter

Impco valveless deckers. The Lindblad rejects are sent over flat screens and then to the deckers. Rejects from this second screening are returned through the washers. From the deckers, stock passes through a DeZurik consistency regulator and is then stored for bleaching.

A Foxboro magnetic flowmeter measures stock as it is pumped to the bleach plant. Because bagasse bleaches with ease compared with some other fibers, only three stages of bleaching are required. The stages are conventional: chlorination, caustic extraction and hypochlorite with washing carried out over Impco stainless washers.

3. Refining—Forming Sheet . . .

From bleached stock storage, bagasse goes through two Miami No. 1 jordans for refining and then is delivered to a proportioning station. Here broke, which is delivered to proportioning via a Dilts broke beater, is measured into the furnish. Stock is then cleaned in a line of 13 Dirtecs washers and through Shartle Selectifier screens into the headbox.

The 134 in. trim Bagley & Sewall machine has a rebuilt stainless steel Fourdrinier and is operated by an Elliott turbine drive. Rolls of paper are delivered from the machine for rewinding and rotary cut. Seybold trimmers are used to guillotine trim the finished product. Paper from Valentine is shipped by trailer, rail and barge.

Perhaps the most impressive thing to a newcomer at this mill is the simplicity of operation and the ease with which the raw material is turned into a sheet of paper.

4. Water and Effluent Systems . . .

To fill its needs, Valentine treats some four million gallons of water a day, pumped from the extremely muddy Lafourche Bayou through a Cochrane lime alum system. The entire water system is automatic.

An elaborate drainage system emptying into a retention pond a mile and a half from the mill is used for effluent, and frequent checks are made to prevent pollution problems from being attributed to the mill.

5. More Pushbuttons to Come . . .

Like so many mills today, Valentine is going in more and more for automatic operation. At first, because of the experimental nature of this mill, full pushbutton operation was not practical. As various processes are standardized, pushbuttons become more and more evident at Valentine. The clay system is fully automatic as is the bleach plant. A Hercules resin emulsifier is also in operation here, as well as a fully automatic starch system.

The Valentine Pulp & Paper story is really just beginning. Working through its exclusive sales agents, Perkins-Goodwin Co., Valentine seems on the threshold of bigger things than its godfathers anticipated. With the experience from Valentine, Brown & Root has announced it is ready to construct and engineer similar plants anywhere in the world, as well as train personnel to operate and maintain them. Interest is apparently high, for in one recent week visitors came from India, Palestine, the Philippines, South America and Europe.

The future of bagasse pulp now seems to rest in the hands of businessmen and the industry itself. One thing is sure—it is no longer a gamble to make paper from bagasse. Valentine's men have extracted much of that risk.

Representative Pulp and Paper Companies

Sales and Earnings — Nine Months 1957

	Net Income (000)	Income Bef. Taxes (000)	% of Sales	Net Income (000)	Net Per Share
MARKET PULP (Also Lumber, etc:)					
Puget Sound Pulp & Timber	$ 19,368	$ 4,844	25.0%	$ 2,326	$1.00
Rayonier, Inc.	89,331	9,022	10.1	4,939	0.90
Weyerhaeuser Timber Co.	318,598	65,326	20.5	41,976	1.39
NORTHERN INTEGRATED COS.:					
Abitibi Power & Paper Co. (8 mos. to 8/31)	n.a.	17,726	—	8,716	2.00
Diamond Gardner Corp.	98,443	9,309	9.4	4,909	1.62
Eastern Corp.	19,043	1,500	7.9	914	2.29
Glatfelter, P. H. Co.	19,188	3,514	18.3	1,566	4.26
Great Northern Paper Co.	50,477	4,782	9.5	2,632	2.29
Hammermill Paper Co.	318,598	65,326	20.5	41,976	1.39
Oxford Paper	44,582	5,210	11.7	2,456	2.22
Warren, S. D.	43,818	n.a.	—	2,316	2.11
INTEGRATED—NORTH AND SOUTH:					
Champion Paper & Fibre (Fiscal Yr. ends 3/31-4, 1 & 2 Qus.)	126,278	19,490	15.4	9,278	2.03
Crown Zellerbach Corp.	350,192	50,997	14.6	28,901	2.03
International Paper	715,548	n.a.	—	53,968	4.38
Kimberly-Clark (Fiscal Yr. ends 4/30-4, 1 & 2 Qus.)	262,749	n.a.	—	20,578	2.23
Marathon Corp.	112,286	10,909	15.9	4,861	1.35
Riegel Paper Co.	46,201	4,402	9.5	2,051	1.56
St. Regis Paper	267,501	30,004	11.2	14,684	1.75
Scott Paper Co.	204,695	32,125	15.7	15,855	1.97
West Va. Pulp & Paper	140,405	17,072	12.2	9,372	1.81
SOUTHERN PAPER & BOARD COS.:					
Union Bag-Camp Paper	120,013	28,621	23.8	13,531	1.86
PAPERBOARD COS.—NORTH & SOUTH:					
Container Corp. of America	192,485	23,716	12.3	11,439	1.07
NON-INTEGRATED PAPER:					
American Writing Paper	n.a.	1,031	—	477	1.76
Sutherland Paper	47,700	5,474	11.4	2,628	2.45
CONVERTER:					
Dennison Mfg.	29,894	3,384	11.3	1,628	2.53

n.a.—Not Available

The sales and earnings for the Nine Months of 1957 were especially prepared for PULP & PAPER by Cyrus J. Lawrence & Sons, members New York Stock Exchange, from statistical services and published reports. While the figures are believed to be correct, no guaranty is given as to their accuracy.

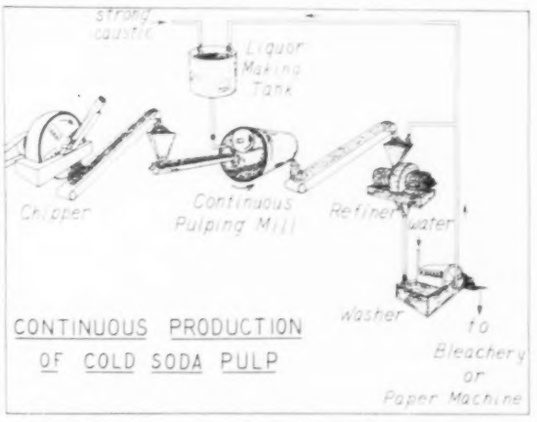
COLD Soda Proves a "HOT" Subject

Semichem session features continuous vs. batch cold soda report, results of cold soda bleaching experiments . . .

• The accent was on cold soda pulping at the final session of this year's Alkaline Pulping Conference, a session always devoted to semichemical pulping—and interest was intense.

To get the "whys" behind this interest, PULP & PAPER's Southern Editor asked members on the program as well as people in the crowded meeting room in Charleston, S.C.'s Francis Marion Hotel. These were some of the answers: "Cold soda is cheaper than groundwood"; "Horsepower requirements for cold soda are lower"; "It uses short fibers which are stronger than long-fibered groundwood"; "It will permit us to use local hardwoods" —probably the most important single reason of all.

First used by the Gould Paper Co., cold soda pulping has been the subject of a great deal of intensified research in recent months (see "Better Pulp from Hardwoods," PULP & PAPER, Oct. 1957, page 60) and might well be one answer to the South's never-ending search for a way to utilize hardwoods.



Cold soda process developed at U.S. Lab, Madison

At the Charleston Alkaline Pulping Conference "experts" told PULP & PAPER that soda pulp lies somewhere between spruce groundwood and aspen, makes an excellent filler product, could be used in such things as tissue and molded products. One Southern mill has a cold soda pilot plant and is experimenting on a 50-ton-a-day basis, although these facilities could be boosted to three times that. Those who have worked with it claim it takes only a half to two-thirds the power requirement needed for groundwood (or about 40 to 50 hp days a ton.)

Continuous versus Batch Pulping...

Continuous pulping by the cold soda method seems to have an edge over batch cooking, according to experiments carried out at the government's Forest Product Research Laboratory in Madison, Wis. Chemical engineer K. J. Brown reported on experiments on red and white oak, aspen, maple, birch, elm, etc. Corrugated board was made on the lab's tiny paper machine from cold soda pulps produced at temperatures from 24° C. to 80° C. with yields up to 87%. Pulps produced at lower temperatures (maximum 45° C.) produced yields up to 92% and were suitable for bleaching.

Continuous pulping was carried out in a caustic soda solution in a roll mill while chips were steeped in caustic and cooked in a digester by batch. It required 15% less chemical solution, 10% less fiberizing energy, board made from continuous pulp showed slightly less strength than by batch (although there was no significant difference in handsheets); continuous pulps averaged 3% brighter than batch.

Brightness in batch cooks was further decreased by recycling the digester drain liquor. Because slightly more residual alkali was found in pressed chips from the batch cook, wash water requirements were greater. Mr. Brown observed that the use of a screw press between the chip treating and fiberizing operations indicates that more unused caustic can be reclaimed.

Bleaching Cold Soda . . .

A tough problem in bleaching cold soda was posed to Shell Chemical Corp.'s chemical sales division by a large Southern mill. These were the requirements: Increase brightness from 38 to 70; increase opacity .83 or higher at 37 lb. weight; total bleaching time of less than four hours; total cost of less than $20 ton for chemicals and steam.

From Shell's sales development dept., R. J. (Bob) Solari reported results of a two-stage hypo and peroxide bleach on mixed Southern hardwoods:

1. Mixed hardwoods were bleached to 72 plus G.E. brightness, cost less than $20 a ton for chemicals and steam.
2. Reversion resistance of pulp bleached by peroxide following hypo stage was substantially better than those bleached by hypo alone.
3. Bleaching improved strength properties, particularly burst.
4. Economic comparisons favored a two-stage process based on 8% calcium hypochorite followed by .8% hydrogen peroxide.
5. Yield loss in hypochlorite bleaching was linear with hypo applied amounting to about 5% when 16% hypo was used.
6. In hypochlorite bleaching the optimum amount of alkaline buffer increased the amount of hypo used. In some applications, use of 2% sodium silicate as a buffer was attractive.

Other Semichem Developments . . .

N. A. Jappe, Institute of Paper Chemistry, and W. J. Nolan, Pulp & Paper Laboratory, University of Florida, reported on experiments in the semichemical field during the past year.

At the Institute, research was performed on the effects of the hypochlorite stage in a chlorine–caustic–hypo bleaching sequence on aspen NSSC. Physical tests on resulting pulp showed that bleaching increases the tensile strength of pulps. Measurements of fiber specific surface, effective specific volume and compressibility all increased as bleaching was made more severe. A chemical analysis of the pulp further showed that lignin was the only pulp component removed in significant amount. A microscopic examination of the pulps showed that delignification is responsible for strength improvement of the pulp while degradation and removal of carbohydrates have a negligible role.

Prof. Nolan reported that fiberizing experiments were performed at the Florida lab on Brazilian eucalyptus and mixed Southern hardwoods to evaluate the results obtained using a commercial size Jackson and Church rotopulper designed to operate at 100 hp full load as compared to results from a large scale mill operation. Two experiments were performed, using cooked and drained mixed hardwood chips sent from a Southern mill compared with screened pulp made in the mill at the same time the sample was taken.

Mill fibration was made at 8 to 10% OD consistency as compared to 25 to 30% in the lab. Results: A laboratory power consumption of 4 to 7 hp-days per ton compared to 10 hp-days per ton at the mill. The lab pulps proved to be 8 to 12% stronger in tear and equal or superior to mill pulps in tensile and burst.

Digester Conditions	*Temp. °F*		*Brown Stock*		*Bleached Stock*	
AA in white liquor % on wood	*Upper*	*Lower*	*Mullen*	*Tear*	*Mullen*	*Tear*
12.1	206	326	206	114	194	122
14.0	212	323	205	116	192	125
12.7	214	326	210	117	201	122
14.9	206	321	206	107	200	122
14.1	198	320	215	113	200	128
14.4	193	316	215	113	200	126
15.0	192	317	210	117	196	130
14.7	194	317	203	127	195	129
13.9	195	315	204	117	201	128
15.6	199	316	201	116	201	125
15.6	202	314	201	116	193	122

Operating Data Shows Kamyr's Effectiveness . . .

Brightness of the bleached pulp made from these cooks was 88.5 to 91.0 G. E. range, indicating high strength at high brightness of Alberta Hi-Brite pulp.

What Hinton Learned About the Kamyr

Tests show how to get top results from continuous cook

Well-satisfied with its two 250-ton-a-day Kamyr continuous digesters, North Western Pulp & Power has learned a few tricks in its operation after almost nine months of production at the big Canadian mill. (See PULP & PAPER, Sept., 1957, Page 52 "What's Different About Hinton?")

Sold on the advantages of continuous cooking, A. C. McCorry, production mgr., and Denholm Smith, pulp mill supt., pointed to these plus marks: Continuous cooking permits uniform control of cooking thanks to accurate metering of chemicals, chips, steam, etc.; economy of operation due to a minimum of corrosion because of lack of air, extreme temperature pockets, boiling in digester; increased production because of time saved in filling and blowing; lower liquor to wood ratio (2.5 to 1 compared to 4 to 1 in most batch systems); high yield as a result of uniform cook; less physical building needed.

But experience has taught Hinton some precautions to take with the Kamyr.

Well-screened chips are necessary. Sawdust can clog strainer and feeder mechanism.

Access to chip meters was modified. Originally it was by inward swinging panel, which made clearing of chip jams very difficult since packed chips prevented the panel from opening. Panel now swings outward.

Discharge mechanisms, owing to restricted openings, are vulnerable to plugging with tramp material and such material should be carefully eliminated from the system.

Occasional plugging of the discharge strainer is experienced, usually when pulp contains a large number of shives. Plug can usually be cleared by stopping the bottom circulation and opening to a larger orifice so the material plugging the strainer discs can be swept away.

Best operating pressure for steaming vessels is strongly related to the liquor temperature in the top of the digesters and these two variables must be carefully controlled to avoid shocks from introducing cold chips to hot liquor and also to avoid flashing of liquor across the high pressure feeders. Typical operating conditions: 200 to 210° F. in top circulating liquor and 12 to 15 psi in the steaming vessel.

(Hinton believes, although they admit they have no definite proof at present, that blow steam is preferable to process steam because the mist of alkaline liquor entrained in blow steam safeguards against possible degradation of steam-extracted wood.)

A Modification—Chip Counters . . .

North Western Mill staffers installed mechanical counters on each of the chip meters. These were made as a positive check even though chip meter rpm. is indicated on a control panel. (Because of the size and speed of the chip meters, direct calibration by diverting chips into a container and weighing them was impractical. At Hinton, meters deliver about 35 lbs. of wood per revolution and operate at 9 to 12 rpm. A five minute calibration, therefore, would involve about a cord of chips. With the aid of counters, Hinton has calibrated meters by comparing the cumulative revolutions with the recorded weight of chips passing over the chip belt from the silos during a period of several hours.)

North Western engineers also suggested that the development of automatic remote control systems for the discharge of the digesters would be an improvement since much of the discharge is manual and is four floors below the operating level of the digester. The digester helper therefore is frequently away from the operating floor and out of touch with the operator.

Salt Cake System at Savannah Solves Distributing Problem

Harried by the problem of effectively distributing salt cake to its various recovery units as its mill grew, Union Bag-Camp has developed

JIM DICKERSHEID (left), Champion, reports on sulfidity, and DENHOLM SMITH, North Western Pulp & Power, on Kamyr digester operation.

a new system which has licked the problem.

At the Savannah, Ga., mill, salt cake is now pumped in slurry form. Mechanical conveying systems became less satisfactory as they got larger and more complex.

Using an automatic batch system, salt cake is mixed with weak liquor in a mixing tank at the main storage area. The salt cake slurry is then pumped through a circulating header passing through the recovery room and at each recovery unit the required amount is withdrawn by a metering pump and fed to that unit. All are controlled from a single location.

Spray Metallizing At Green Bay . . .

Although warned by metallizing companies that spray metallizing digesters was as yet unproven, Green Bay Paper and Pulp Co. in 1954 decided to try it in hopes it would correct corrosion and pitting in the mill's four 16 ft. spherical digesters.

Initially, the mill tried a spray bond of molybdenum, from .004 to .005 in. thick covered by stainless. "The roof fell in a couple months later," said Loren Smith, Green Bay engineer. While molybdenum was successful in other spherical applications, Green Bay's cook cycle was not compatible.

Best results were obtained with a very light flash coat of No. 10 low shrinkage carbon steel covered with a finish coat of Metcoloy No. 1 or a low shrinkage 18-8 stainless steel. Green Bay's No. 2 digester was so covered and has been in operation more than two years with negligible maintenance.

A second digester was coated by Metalweld Co., Philadelphia, with .003 in. of 420 stainless steel capped with .012 in. of 316 ELC stainless. This has been "most satisfactory" for six months.

How About Spruce Pine?

Spruce pine is a species which continues to gain stature in the South, mainly because its shade tolerance permits its continued regeneration, even in stands of mixed hardwood.

Studies at Gaylord Container Corp. reveal that it produces a good grade of pulp. R. O. Koch and J. E. Sapp of Gaylord reported to yields in spruce pine are about the same as the yield of other pine species. Bleached and unbleached pulp of spruce pine fibers are comparable in strength to other pines—somewhat higher in burst and lower in tear.

Active vs. Effective Alkali . . .

Of many cooking variables in the manufacture of bleachable sulfate pulp (time, temperature, volumes of liquor, etc.) sulfidity of cooking liquor is the only variable which cannot be kept within close limits of fluctuation. One method used to minimize the effects of varying sulfidity on the bleachabilty level of pulp is to maintain a constant level of applied alkali.

This can be done on the basis of either constant "active" alkali (the sum of sodium hydroxide and sodium sulfide) or the constant "effective" alkali (the sum of sodium hydroxide and half the sum of sodium sulfide.)

In general, sulfidity of kraft cooking liquors in mill operations is maintained between 20% and 40%. If lower than 20%, pulp strength decreases and demand is increased. The 40% level is about maximum presently obtainable from conventional chemical recovery operations, even with the aid of black liquor oxidation.

Champion Paper & Fibre Co. made test to compare active and effective alkali performance. James Dickersheid, research project engineer, reported that in the manufacture of bleachable grade sulfate pulp from Southern pine, the active alkali basis for applying cooking chemicals to wood is better than the effective alkali in the range from 15 to 35% sulfidity. However, even the active alkali basis was not suitable when sulfidity varied above 35%.

Other Notes From Charleston . . .
Whittle Stresses Forest Planning...

Lucian Whittle, mgr. of Brunswick Pulp & Paper Co.'s woods division, described trends toward pulpwood stabilization and utilization in Southern woodlands and the importance of forest management. M. N. May, institute of Paper Chemistry, gave results of tests in the reuse of black liquor for dilution purposes. The conclusion: Reuse does not appear to have any serious deterious effects on the strength properties or the bleaching characteristics of pulp.

Theodor Kleinert and Carlton Joyce, Pulp and Paper Research Institute of Canada, discussed use of ultraviolet and short wavelength methods for controlling stream pollution and absorbing lignin.

H. Y. CHARBONNIER (left), chairman of Alkaline Pulping Conference, and JAMES L. RITCHIE, U.S. Pulp Producers, guest speaker.

Ritchie Comments On "Bullets-Butter" Economy

The U.S. has been living in a "bullets and butter" economy triggered by defense spending.

So commented James L. Ritchie, executive director of the U.S. Pulp Producers Assn., Inc., and luncheon speaker at TAPPI's 11th Alkaline Pulping Conference in Charleston, S.C.

Mr. Ritchie laid the present high level of economy in U.S. at the door of defense money, pointing out that the past 19 years of American history has witnessed an endless swing back and forth between a "bullets" (wartime) economy and a "butter" (peacetime) economy. Our economy has not suffered with these transitions, he said, because of U.S. industry's ability to change swiftly.

But Mr. Ritchie warned: "Our people have long felt that if we could maintain full employment of our population, we would have reached our zenith. Unfortunately this is not so. As labor gets stronger it increases its demands. The result—steady inflation and decrease in size of the dollar.

"The government has settled this conflict by sound money, reducing government spending and increasing interest. A little unemployment can correct the problem; too much can set in motion the more dangerous forces of depression."

An ironic note, pointed out Mr. Ritchie, is that orders for capital goods are falling off, resulting in more unemployment. But he reminded the crowded banquet room there have been six such transitions since World War II began—all successfully bridged.

The pulp, paper and board industry, he said, stands to gain more than any other industry in the shift from capital goods to consumer goods. The major challenge now is introduction of competing materials.

On Location in Europe . . .

A Special PULP & PAPER Report . . .

By M. F. HOLSINGER
European Manager for PULP & PAPER and other Miller Freeman Publications

SPECIAL FROM STOCKHOLM—Three months of contact work in some of Europe's principal centers, reveals some trends and developments of major significance to industry. Optimism is observed nearly everywhere.

Initial contacts have encompassed a representative cross-section of both industrialists and suppliers—American and European—in centers ranging from Britain on the west to Sweden, and several weeks in the throbbing industrial centers of amazing Germany from Lubeck to the Ruhr and on to Frankfurt; thence to the humming commercial center of Zurich. The big overall picture rapidly unfolding is one of no little portent to producers and exporters everywhere.

Market Plan Gaining

As little as three months ago the European Common Markets Plan seemed to be receiving scant notice from some, was usually termed "a long range prospect" by others. In the brief interval since that time, ECM has become an increasing factor in business planning, most noticeably on the continent, but now suddenly increasingly so in England. Neither is it being ignored by U.S. firms having a major stake in export.

Manufacturing concerns in the U.K., both British and American, seem suddenly aware things are moving faster than expected, are now taking stock of their situation with an eye to the competitive fray over the bigger mass markets that loom on the horizon.

Just before returning again to Stockholm my "hired" TV set installed in our hard-won 2-W.C. "Maisonette" flat at 25 Montagu Square in London, produced several intelligent BBC discussions of ECM and its implications. The present Conservative party in Britain now seems determined to include Britain in. At the same time rapid steps are being taken to implement the informal agreements reached at the recent prime minister's huddle for tightening Commonwealth trade ties. An important element in the latter (certainly from the U.S. viewpoint) was the informal plan for increasing (diverting if you will) Canada's imports from Britain by a whopping 15%.

Canada's market seems all at once to have become uppermost in the minds of many an export sales manager in the U.K. and on the continent. Prime interest focuses on the lush Canadian heavy machinery markets represented by forest products and other industries. I lunched with a prominent export sales executive who that morning had attended a meeting with British government officials interested in formalizing the 15% plan by making it a part of contracts awarded by Ottawa.

In brief, the expectation here is for continued rapidly soaring living standards, mass markets created first among six or seven nations trading freely and eventually embracing the 260 millions of people of 17 western European nations.

U.S. Business Men Everywhere . . .

That American interests are not overlooking this picture is quite evident. In every city visited I met U.S. business men on the prowl. Noticeable among them were those who had recently hauled out plans that had alternately been toyed with and pigeonholed since the days of the Marshall Plan. Events of recent months seem to have crystallized fuzzy thinking of the past and preparations are underway to "have a go." Licensing and subcontracting are being expanded, wholly or partly owned manufacturing facilities being established, and shiny new offices being occupied (when they can be found).

An explanation of what is happening is perhaps best illustrated by the statement made to me by a newly-arrived overseas manager for one of the largest and better-known heavy specialized machinery concerns in the U.S. Sitting in glistening new offices in Zurich, he stated his company's position simply: "We are convinced that Europe, along with the undeveloped raw-material producing areas of the world, is in the initial stage of the greatest boom in history. The consumption of petroleum, metals and other raw materials, with which our companies are concerned, will continue to sky-rocket and living standards soar. We are simply getting better set-up to participate in this situation."

"We are dedicated," he added, "to the premise that a sound plan of foreign manufacturing, engineering and sales serves to feed and build the export of other products from our U.S. plants, rather than decrease them."

(L. to r) Arvola, MacDonald, Harvey, Barton, Harrison, Nelson, Kuefner, Cash.

New District For Oldest TAPPI Section

The new Golden Gate district in the first and oldest section of TAPPI, the Pacific Section, was launched auspiciously recently at a San Francisco dinner meeting, with about 130 members, prospective members and guests attending.

C. R. P. Cash, Fibreboard Paper Products Corp., acted as chairman pro-tem. W. D. Harrison, Riegel Paper Co., national president, TAPPI, told of its ideals and R. G. Macdonald, national secretary, traced its history. He paid tribute to the late Robert M. True, General Dyestuff Co., one of the prime movers in organizing the Golden Gate section, and suggested that an award for competitive papers be named after Mr. True.

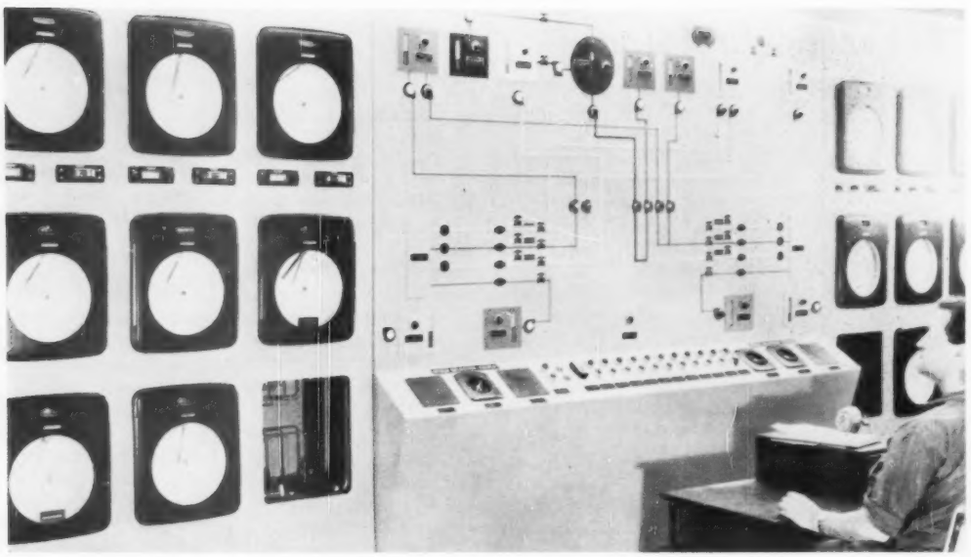
Dr. John S. Barton, Western Waxide Div., Crown Zellerbach Corp., was elected chairman, other officers are: Wayne H. Kuefner, Flintkote Co., vice chairman, and Harold H. Harvey, Penick & Ford, secretary-treasurer. Members of the executive committee include the above, and Harris B. Fenn Jr., National Aniline; T. J. Nelson, California & Hawaiian Sugar Refining; Walter D. Esselstein, Bemiss-Jason; and Dr. Walter F. Holzer, Crown Zellerbach, committeeman-at-large.

Mr. Cash stated that waste paper mills in north California are now producing about 1,000 tons daily. He said there are about 16 papermaking machines in the area.

T. Arvola, California Division of Forestry, told the group of possibilities of a 6,000 ton per day wood pulp industry in the state, in his talk on "Forest Resources of Northern California". Mr. Arvola said that California ranks second among states in its available timber volume, but only 23rd in woodpulp production.

Woops, Our Error!

In our November issue we reported that Ray Bennett and Don De Noyer were touring West Coast mills. This was quite true. But we erroneously identified these gentlemen as with Appleton Machine Co.; whereas they are with Valley Iron Works —Mr. Bennett as West Coast sales mgr., operating out of Appleton, Wis., and Mr. De Noyer, vice president of engineering. We regret this error.



Visual Indication of Flows . . .

. . . via this Foxboro designed and equipped graphic panel at Ontario-Minnesota Pulp & Paper Co. Ltd., Fort Frances, Ont., Division.

New 4-Stock Distribution System

. . . to Two Paper Machines Making Specialties

The Problem:

Startup of the new No. 10 newsprint machine at Kenora, Ont., and speedup of No. 7 newsprint machine at Fort Frances Ont., released No. 5 machine at Fort Frances for production of specialty papers. This necessitated a new pulp proportioning and distributing system.

The Solution:

It was decided to install a modern continuous proportioning and distributing system for both No. 5 and No. 6 machines. It would require 2,000 ft. of stainless steel piping and handle four types of stock—groundwood, sulfite, kraft and broke, all to be used in varied amounts or mixtures for the varied specialties to be made. A graphic panel central control, magnetic flowmeters and other modern appurtenances were selected. Existing Hydracycles could be used, simplifying the layout.

● The new multiple stock system at this Ontario-Minnesota Pulp & Paper Co. Ltd. mill was worked out according to a plan developed by the engineering staff of the parent firm, M & O Paper Co.

J. F. McKellar, vice president and general mgr. of the Canadian company; F. G. Williams, resident manager at Fort Frances; James H. Davidson, chief engineer for M & O, who bases in Minneapolis, and Tom Harrison, who was resident engineer at Fort Frances (he recently moved across river to the International Falls mill), were principally involved in the supervision and development work.

As visitors to these international boundary line operations know, groundwood is made on the Canadian side at Fort Frances and kraft and sulfite at International Falls mill on the American side. The pulps are pumped in slurry form across the International Bridge, to each mill as needed.

A blending chest with agitation was needed and by providing a proportioning system for No. 6 paper machine, the existing Hydracycle chests (made by Shartle Bros. division of Black-Clawson) could be used as blending chests for each proportioner and No. 5 and 6 machines would have identical systems.

This had the important advantage of simplifying the general layout. In order to avoid the complication of orifices, purges and differential pressure measuring devices, Foxboro magnetic flowmeters were installed.

Other Equipment . . .

It was decided to install Fischer & Porter Ratogate valves. For consistency control, DeZurik regulators were installed. The new proportioning system required a considerable rearrangement of stock piping and stock chest contents.

In addition to the proportioning system, improved agitation was provided. In three chests larger drives were installed on existing agitators, and in one storage tank, agitation was provided by an Allis-Chalmers Sideflo unit. The system was set up so any of the specialty stocks can be pumped to No. 5 machine in the future, with minor changes.

Each chest is provided with one pump for each machine as required. These pumps feed into common lines, with shutoff valves remotely controlled from the Foxboro equipped graphic panel.

How Proportioning is Done . . .

Proportioning equipment is housed in an extension to the Hydracycle building and consists of eight Ratogate flow control valves, eight Fox-

boro magnetic flowmeters and six DeZurik consistency regulators. Broke is not yet controlled by a regulator, but room has been left for future addition of one more regulator for each machine.

Control valves are installed vertically near the floor with the dilution lines immediately above. The control valves cause considerable turbulence which helps to mix stock and dilution water. After the dilution lines the magnetic flowmeters are installed. The DeZurik regulating chambers follow flowmeters. The magnetic flowmeters require no straight run of piping or straightening vanes, giving better control.

Panel Operation . . .

All valves and pumps, except the machine chest pumps, are operated from the graphic panel. Light symbols show which valve is open or which pump is running. Lights are operated by actual movement of the valve or motor starter, and will not light up unless the valve has actually moved or the starter made contact. The machine chest pump is started and stopped by the machine chest tender, but a panel light indicates when it is running. If a paper machine shuts down, a warning bell at the panel rings. High chest level and low flow alarms are provided. The low flow contacts also close the dilution valves.

The machine chest level controls the groundwood flow valve, and all other flows are related directly to groundwood flow. The flow rate ratios are set on sub-panels below the flow recorders.

White water for dilution is provided by a header supplying the dilution valves. To maintain uniform pressure across dilution valves, this header is made large, and is supplied by gravity from a 600 gal. constant head tank fed from mill white water system.

Advantage of Flowmeter

One advantage of the magnetic flowmeter is that the measurement signal is proportional to flow so the accuracy remains the same at all flow rates. Also, the Ratogate valves provide a very uniform control action over a large range of openings, and with this combination, control action is extremely stable. Even if a severe disturbance occurs, it takes very little time for the system to settle down. This is necessary as production requirements call for a wide range of flow rates.

Accurate proportioning has enabled the mill to reduce chemical pulp furnish for some sheets due to better uniformity. With continuous proportioning, once the ratio has been set, errors cannot occur.

For control lines, 500 ft. of 19 tube Bailey Armortube was run. An additional 2,500 ft. of copper tube was run in cable trays. Over 2,000 ft. of stainless stock lines were run. Both Type 304 and Type 316 stainless steel pipe were used. Fabricating of stainless steel for the system was done by McDonald Bros., Winnipeg, Man. And the whole system was installed and put into operation without interfering with production.

How Mando Mills Expanded in 1957

1. New No. 10 Beloit Fourdrinier 21 ft. wide newsprint machine at Kenora, Ont., along with new grinders, screens, refiners, digester, etc. (see PULP & PAPER, June 1957, p. 52).
2. High pressure Combustion Engineering (240,000 pph steam at 1,290 lbs. pressure) and General Electric 6200 kw topping turbine at International Falls, Minn. (see PULP & PAPER, June 1957, p. 54)
3. New Swedish Strindlund type brown stock washers, made by Black Clawson Co.'s Shartle Bros. Div., at International Falls (see PULP & PAPER, Oct. 1957, p. 45).
4. New headbox on No. 4 Insulite insulating board machine, International Falls, made by Bros. Inc., Minneapolis, with five adjustable inlet gates.
5. New distribution system for kraft, sulfite, groundwood and broke at Fort Frances, Ont. (described below).
6. Modernized electrical distribution and transmission system at Kenora—necessitated by new No. 10 machine. Power demand in mill itself increased from 32,000 hp to 60,000 hp, requiring connection to outside power systems.

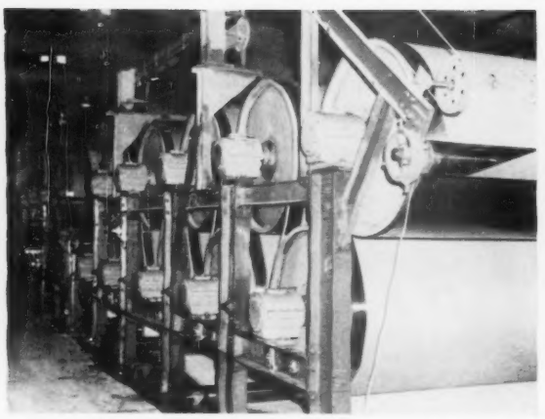
Closed System Saves Water, Cuts Costs . . .

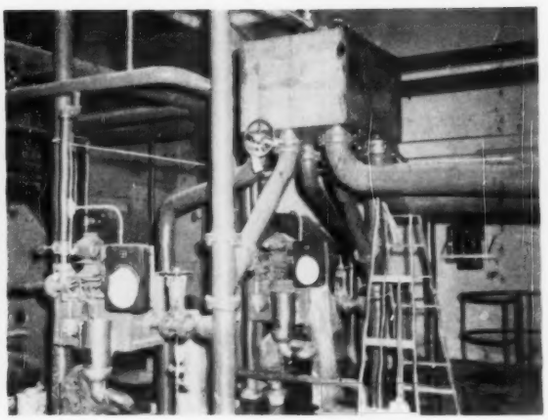
Mill saves water by treating, refining and so re-using that only dissipated water by evaporation is replaced

● Water is expensive in Alameda county, Calif., and the conservation of process water is one of the most interesting problems solved at a new $2,500,000 paper mill of American Forest Products Corp. at Newark, in that county.

A completely closed system to cut down the amount of water purchased from the water district was worked out by L. J. Meunier, Jr., manager and designer of the mill, in conjunction with engineers of Sveen-Pedersen Co. The preservation of water by treating, refining, and re-using has been developed to such an extent that only the water dissipated by evapora-

Head men for AFD
L. J. Meunier, Jr. (left), mgr., and C. M. Whittier (right), supt.





Some of new equipment in American Forest Products mill . . .

. . . includes Lukenweld dryer section rolls (left) and Trimbey automatic consistency regulators with Bristol instruments (right).

tion needs to be purchased for make-up. Some 475,000 gallons of water are used.

One of the mill features is the paper machine 200 hp drive through an Eaton Dynamatic coupling. Heat from this coupling is dissipated by water and discharged at 160° into a make-up tank—a 75,000 gal. concrete tank which also serves as part of the foundation of the mill building. The tank is 16 ft. wide, 13 ft. deep and 28 ft. long. The water from the coupling raises the temperature of the water in the system to such an extent that no steam is needed for heating the water used in the pulpers.

Water from the machine goes through a Sveen-Pedersen saveall lined with ceramic tile by Chemical Linings, Inc. From the saveall water goes into the underground water tank, whence it is taken again to use on the paper machine showers, and wherever else it is needed in the process.

This water tank is equipped with a constant level device, and any overflow is automatically pumped out to two earthen ponds, each holding 200,000 gals.

In reverse the water can be brought back from the ponds to keep up the water level in the concrete tank, when required, by use of a 700 gpm Fairbanks-Morse pump. This pump only works when activated by a level control switch. If there is no water in a pond to return, a drop of a foot in the level of the concrete tank activates a switch which turns on the public water supply.

Supplies Container Plant . . .

The new mill covers an area of 35,000 sq. ft. It is adjacent to the company's corrugated container factory. Daily production is 60 tons and partly supplies the corrugating plant.

Raw material is baled corrugated scrap, trucked to the mill, and stored in the yard until brought to the 100 hp powered Apmew pulper by a Clark fork lift truck. General Electric supplied all motors and switch gear.

From pulper, stock goes through a Bird Centriffler and a Bird Dirtec, then to two Trimbey centrifugal screens, and to pulp thickeners built by Mr. Meunier. Rejected stock from screens goes back for repulping.

From thickeners the stock drops into two concrete agitated chests. The plant has a two stock system, but uses the same equipment to make both liner and filler stock.

From chests, stock is pumped by a Fairbanks-Morse stock pump to two Shartle Miami jordans each driven by 400 hp synchronous motors.

The Machine . . .

The 102 in. Fourdrinier machine, built by Osborne Paper Mill Machinery Co., has a rebuilt Sandusky suction couch. Next are two suction presses, and weighting is all done by air. After the second press the dryer section consists of two sections of Lukenweld high pressure 48 in. diameter dryers. After the first 21 dryers is a size press, then 10 after dryers, followed by two calender stacks, one wet and one dry, and a Pope-type reel.

Stock is trimmed to width on an Osborne winder. Rolls are taken to winder by an overhead crane which also serves the machine. From the winder, rolls are taken by lift truck to the corrugating plant.

Machine sections are driven off the main line shaft by cone pulleys and Extremultus belts, manufactured in Germany, and all sections are controlled with Fawick air clutches. Steam is supplied by a Wickes 250 hp automatic water tube-type boiler.

The mill building is 300 ft. long and 50 ft. wide. Under the beater room and wet end of the machine is a basement. The building is of tilt-up concrete construction and supporting bents are all pre-cast concrete which were formed and built on the site.

The Staff . . .

Mr. Meunier started in the paper business with North Carolina Pulp Co., Plymouth, N. C., where he spent nine years, working up to pulp mill supt. Then, for a number of years he was with his father, L. J. Meunier, Sr., president of Eagle Paper Mills Inc., Downingtown, Pa., as general manager. In Apr. 1956, he joined AFP Corp.

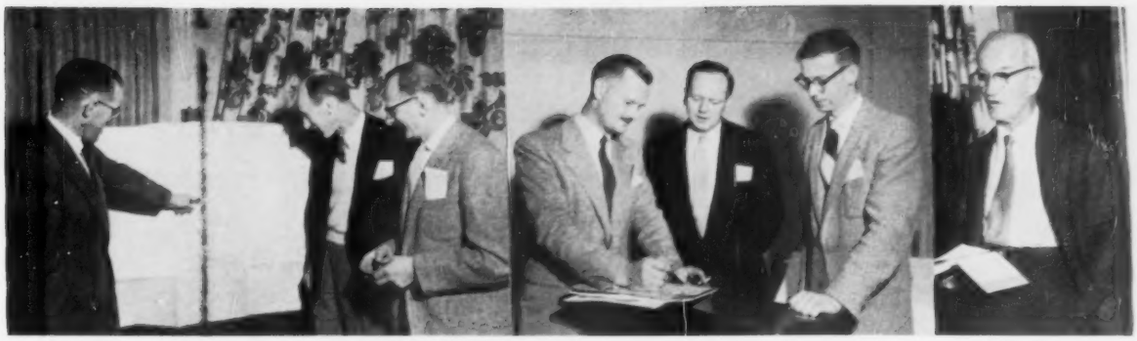
C. M. Whittier, supt. of the new mill, started with Oregon Pulp & Paper Co., Salem, Ore. He was tour boss with Flintkote Co., San Leandro, Calif., before joining AFP Corp.

Strike Loss in B.C. Reckoned in Millions

British Columbia's pulp and paper industry has been paralyzed since mid-November as a result of a strike tieing up all major mills, and the cost in lost production and wages was estimated Dec. 1 as close to $10,000,000.

Approximate value of the province's pulp and paper output has been averaging $16,000,000 a month, and the payrolls have been about $3,500,000. Only Westminster Paper Co. and Sidney Roofing & Paper Co., primarily in converting, are not affected.

While British Columbia pulp and paper mill workers are among the highest paid hourly workers in Canada, the union has been comparing the base rate in Bellingham, Wash., mills of $2.01, with British Columbia's $1.72 an hour. The union is not insisting on the Bellingham rate, but is using it for comparison.



Participants at Nanaimo Technical Session . . .

At left (l. to r.)—JAMES C. HUNTER, Powell River Co., points out grinders on mill flowchart for F. P. GRIFFIN, of MacMillan & Bloedel Research Dept., and E. ELSERMANN, Columbia Cellulose Co. At right (l. to r.)—GLEN H. SOMMERS, Elk Falls Co. Ltd., F. E. MURRAY, B.C Research Council, C. D. BOWN, Columbia Cellulose Co., and C. D. ORCHARD, B.C. deputy minister of lands & forests.

Southern Climes versus Northern . . .

. . . in competition of forest products throughout world

• C. D. Orchard, deputy minister of lands & forests, commented on this growing battle for world markets less than a week prior to start of the November strike closing down all pulp-paper-paperboard production in British Columbia.

Guest speaker at the fall meeting of Canadian Pulp & Paper Assn. Technical Section, held in Nanaimo, Dr. Orchard stated "B.C. lives in large measure by its forests. One-third of the province is unproductive mountain tops and glaciers, one-third sub-alpine meadows, water and marshes, and one-third soil only good for producing trees and a negligible amount, perhaps two percent, suitable for agriculture."

Dr. Orchard said B.C. foresters "will have to grow more wood faster and cheaper if the industry is to justify wages of up to $2 per hour for common labor. Productivity will have to go up if we are to compete with the fast-growing low-cost products of warmer countries . . . there is no question we have priced ourselves out of the (forest products) market."

Dr. Orchard cited New Zealand where he visited a 192,000-acre planted forest growing wood at the rate of 300 cu. ft. per acre per year compared to B.C.'s 20 cu. ft. That country is "growing twice as much wood as its industries can consume. It has captured the Australian market from which Canada has been ruled out by exchange and price obstacles."

Dr. Orchard says he is "not afraid of competition" from plantation growth. By the time they become a threat by today's consumption standards the rest of the world will be consuming 35 pounds of pulp products annually—up to 11 or more times present standards.

"We in B.C. have an awful lot of acres growing a quality of wood they can't touch. But we must keep our costs competitive."

Faster Cooks . . .

In reporting on the effect of additives in cooking dissolving grade sulfite pulp, Dr. E. Elsermann, resident chemist of Columbia Cellulose Co., disclosed that use of Petro-P (product of Petrochemical Corp., Long Beach, Calif.) effectively reduces the required cooking time when used at low acid strength but has little or no effect at high acid strength. Experimental small-scale cooks at 148° C. were cited as follows: At 5% acid strength cooking takes 7 hrs. with Petro-P, 7 hr. 20 min. without the additive; 7% acid strength, 6 hr. 10 min. with additive and 6 hrs. 20 min. without; 9% acid strength, 6 hours with or without.

Newsprint Pulps . . .

Brightness factors worked out by MacMillan & Bloedel in substituting kraft pulp for sulfite in making newsprint at the Port Alberni mill were reported by F. P. Griffin. He said the use of higher brightness semi-bleached kraft will not eliminate the need for zinc hydrosulfite brightening of groundwood to bring brightness of the resultant newsprint up to the mill's minimum acceptable 56 G.E. standard.

The most economic level for semi-bleached kraft used for this purpose was found to be 65 to 70 G.E. for a furnish consisting of 18 to 24% chemical pulp. A conventional 3-stage (chlorine-hypo-extraction) process has been adopted as the economical means of achieving the prescribed range for the mill's "over 150 tons of kraft going into newsprint." Due to local conditions, brightening costs were estimated at 50¢ per point per bone dry ton for groundwood from 55 to 60 brightness; 18¢ per point for kraft.

The new groundwood mill started up a year ago by Powell River Co., Powell River, B.C., currently produces two tons of mechanical pulp (bone dry basis) per man-hour worked. It now has four 64-in. Waterous Great Northern grinders and four more to be installed. Output is expected to be upped to 2.9 tons.

In reporting findings at Columbia Cellulose Co. on use of dry sodium aluminate in water treatment, C. D. Bown estimated savings of some $35,000 per year are possible (treating 70 million gal. per week).

Blow Heat Recovery . . .

Discussing the recovery of blow heat at Elk Falls Co. Ltd., Campbell River, B.C., kraft mill foreman Glen Sommers indicated that 29.2 million btu of recoverable heat resulted per cook. Digesters are blown to a cyclone on top of the blow tank and the flash steam educted to a jet condenser on the hot water accumulator. Hot contaminated water overflowing from the condensate tank is filtered and pumped through Rosenblad heat exchangers and utilized for heating fresh water. No steam is needed for heating wash water to digester and bleach buildings, and excess hot water is available for paper mill use.

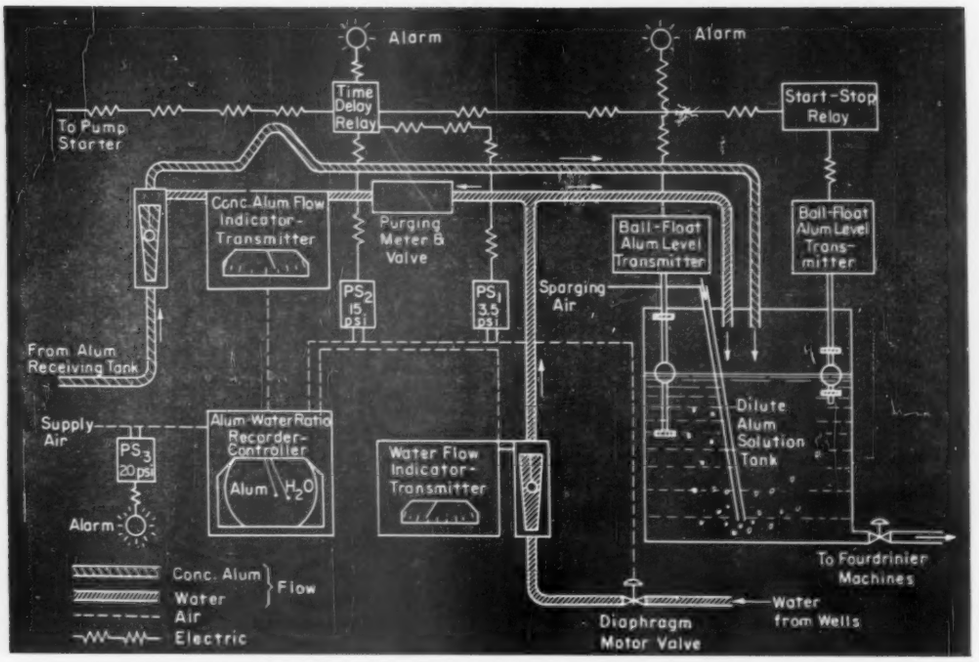


Figure 1—For seven paper machines, an answer to handling alum. This is . . .

How Automatic Alum Dilution System Works...

. . . . at Hamilton mill. Advantages of system include improved controls, reduced hazards in handling and labor savings

By
C. M. CONNOR, Vice President, S. H. POPOVICH, Technical Director, and D. K. McCURDY, Chemical Processing Technician, Hamilton Paper Co., Miquon, Pa.

● Since Sept. 1956, when an automatic alum-dilution system was installed to serve all process alum requirements of seven Fourdriniers at the Miquon, Pa., mill, savings in labor costs have been substantial.

An important result is that the automatic system has operated since installation without continuous supervision; the only attention required on a regular basis being daily routine tests of the solution density in the dilute storage tank. Another important advantage of the liquid form was that it took less time to handle.

There were, however, several drawbacks in mixing the alum solution by hand. There was still some hazard in handling the liquid alum, and the dilution process continued to take more man-hours than we liked. Most importantly, intermittent mixing of the dilute alum solution and rapidly changing process demand frequently resulted in a dangerously low reserve.

The automatic alum dilution system shown schematically in *Fig. 1* was designed in 1954 with field engineers of Fischer & Porter Co., Hatboro, Pa., which provided all instrumentation. Our objective was to provide sufficient dilution capacity to meet present demand—averaging 8 gal./min. of 1 lb./gal. dilute alum solution—and a 50% increase in anticipation of future plant expansion.

Daily routine tests of the solution density have never required any significant adjustment of the alum-water ratio since the system has been under operation. Alarm circuits give warning in the event of loss of either alum or water supply, failure in the air source, or too little or too much solution in the dilute alum tank.

Components of System

Concentrated alum solution at 5.5 lbs./gal. is received from a local producer in tank trucks and loaded in a lead-lined wooden receiving tank of 11,000 gal. capacity located just inside the plant. The concentrate is then fed from the receiving tank through lead piping to the dilution system.

The flow rate of the concentrated alum solution is metered and indicated on an instrument (upper left in *Fig. 1*) located at a convenient indicating point just above the dilute alum solution tank (top of tank is below the photo in *Fig. 2* and most system instruments are mounted together on the wall). Water is received (lower right in *Fig. 1*) from the common well source; its flow is metered and indicated at the indicating point.

The meter range on the concentrated-alum flow indicator is 15 to 150 gph while the range of the water flow indicator is 60 to 600 gph. For the average process requirement of 8 gal./min. of dilute alum solution, the flow rates of concentrated alum and water are about 88 gph and 392 gph.

Flow rates are transmitted pneumatically (3-15 psi system) from the two indicator-transmitters to the alum-water ratio recorder-controller, also located at the indicating point above

the dilute alum solution tank. Both flow rates are recorded at this instrument on a 24-hour circular chart. The concentration of the dilute solution is maintained at 1 lb. gal. during the flow of alum concentrate by controlling a diaphragm motor valve in the water line through a pneumatic transmitter from the recorder-controller.

The flow of concentrated alum solution is controlled by a start-stop relay connected to a pump in the line from the alum receiving tank. Action of the start-stop relay is controlled by the level of dilute alum solution in the tank through a ball float with a 5-in. travel and a level transmitter (right-hand side of dilute alum tank in *Fig. 1*). The concentrated-alum pump is shut off just before overflow when the ball-float reaches the top stop 4 in. from the top of the tank. The pump is started again when the ball-float on the surface of the dilute alum solution drops 5 in. to the lower stop. A level alarm system (lefthand side of tank in *Fig. 1*) energizes the alarm circuit when a separate ball-float reaches either an overflow-level stop or a stop at the half level.

The dilute alum solution tank is 8 ft. in diameter and 8 ft. high, with a maximum capacity of 1400 gal. Air is sparged into the solution at the bottom of the tank to aid mixing and prevent stratification.

Preventing Crystalline Deposits

Two simple measures have been taken to prevent the formation of crystalline deposits in the concentrated alum flow meter and meter extension tube due to contact between the concentrated alum and air in the meter.

First, an upward U-bend has been placed in the concentrated alum line so that when the pump stops the alum solution will not drain into the dilute tank back to the flow meter and allow air to reach the meter. Second, 50 cc. min. of water is taken off the main water line and fed by a purging meter and valve into the flow extension tube of the concentrated-alum flow meter. The purge water runs down the float extension tube above the flow meter into the flowing alum concentrate in the meter itself and so prevents crystallization where the concentrate would normally meet air in the extension tube.

Although a small amount of water is being added to the system in this manner, the dilution rate is not affected because the purge water is included in the total shown on the water flow indicator and transmitted to the recorder-controller.

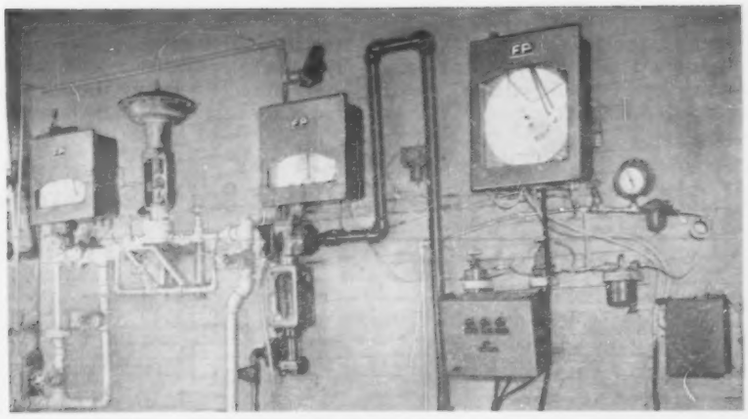


Figure 2—Installation looks like this . . .

Control instruments in alum dilution system are mounted along wall above dilute alum solution tank. From left to right above piping are water-flow indicator-transmitter, diaphragm motor valve, concentrated-alum indicator transmitter, and alum-water ratio recorder-controller. Below ratio recorder-controller at lower right, alarm box includes an "alarm reset" button and three alarm lights—"supply air," "controlled air" and "alum level"—corresponding to three alarms shown left to right in Figure 1.

Failure Alarms

There are three possible sources of failure in the automatic alum dilution system:

1. Insufficient (or no) alum flow—should either the alum pump fail or the supply of concentrated alum become exhausted.

2. Insufficient (or no) water flow—water from wells reduced or exhausted by demand in rest of mill.

3. Loss of utility air—signals not transmitted between the ratio controller, indicators and water valve.

Failure in alum flow is alarmed through a 3½-psi low-pressure twitch (PS_1 in *Fig. 1*) in the air line from the recorder-controller to the water valve. When the level switch in the dilute alum solution tank is actuated at the lower (9 in.) level, a signal is sent simultaneously by the start-stop relay to the alum pump starter and the time-delay relay. Normally, the resulting alum flow initiates a signal from the indicator-transmitter to the controller.

An air signal above 3½ psi is thence sent to the water valve through PS_1 to start water flowing. If no alum should flow, there will be no signal sent to the ratio controller and in turn no signal (pressure less than 3½ psi) in the air line to the water valve. There will consequently be no signal from PS_1 to the time delay relay, and the alarm will be actuated.

Failure in water flow is detected by the 15-psi high-pressure switch (PS_2 in *Fig. 1*) in the same line as PS_1. If there is not enough water to maintain the proper alum-water ratio, the transmitter at the recorder-controller will increase the air pressure to the water valve in order to open the valve to allow more flow.

If the water flow remains too low (or is zero), the pressure will keep rising to produce the maximum open position of the valve. When the pressure reaches 15 psi, PS_2 will energize the timedelay relay and then the alarm. The time delay relay is necessary in the event that the valve is fully open only momentarily, without any harm to the system.

The 20-psi high-pressure switch (PS_3) will signal the failure of the

McCurdy . . .

Connor . . .

Popovich

utility air supply to the system. If the supply pressure falls below 20 psi, it is assumed that the system air pressure range of 3-15 psi is not being properly sustained.

As any alarm is energized, the concentrated-alum pump is shut off so that the alum dilution system cannot operate under a failure condition. A red alarm light flashes in each case of alarm in the plant office. Simultaneously, either a horn sounds or a light flashes (the choice is optional) at the control point above the dilute alum solution tank (*Fig. 2*).

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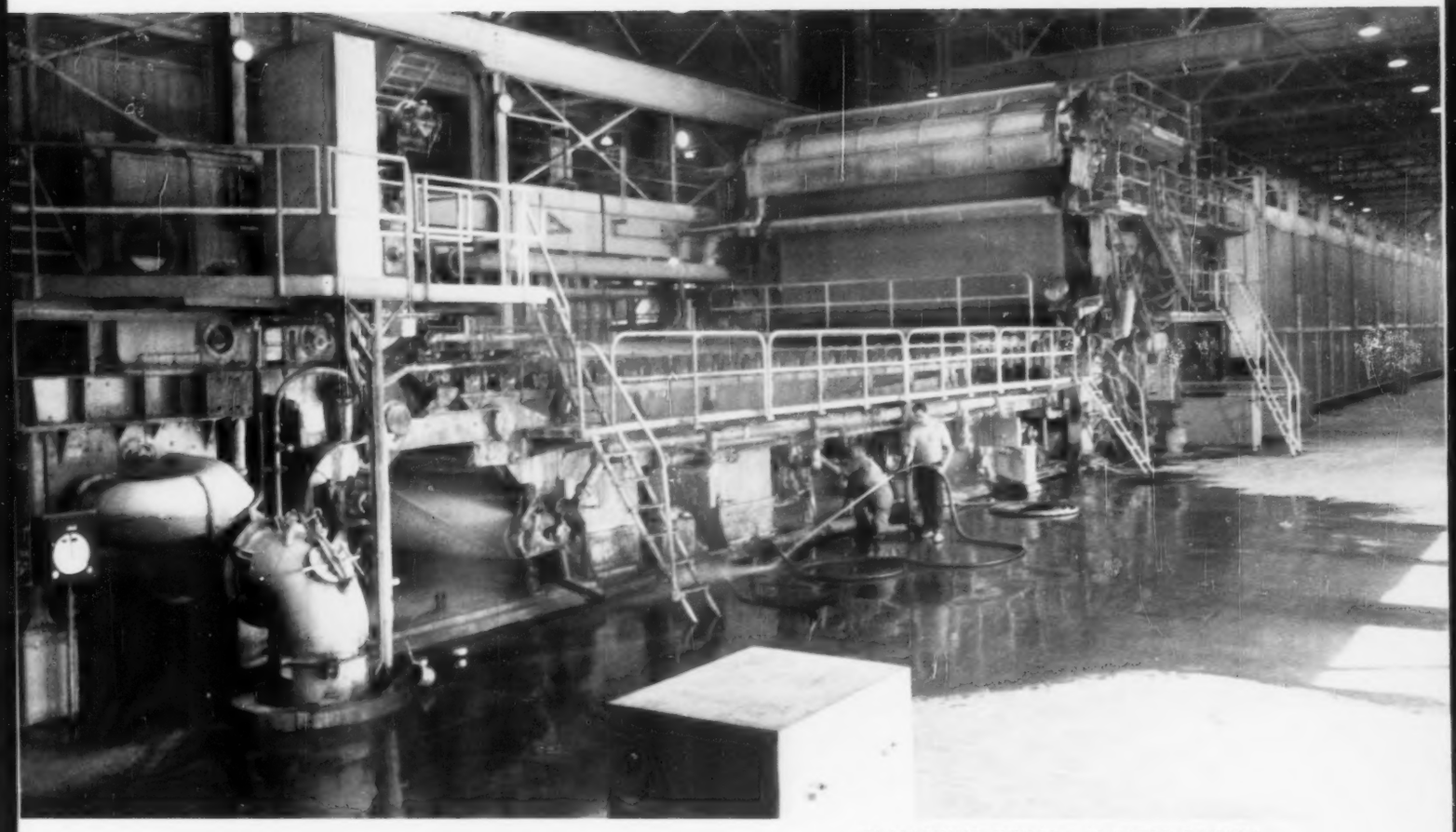

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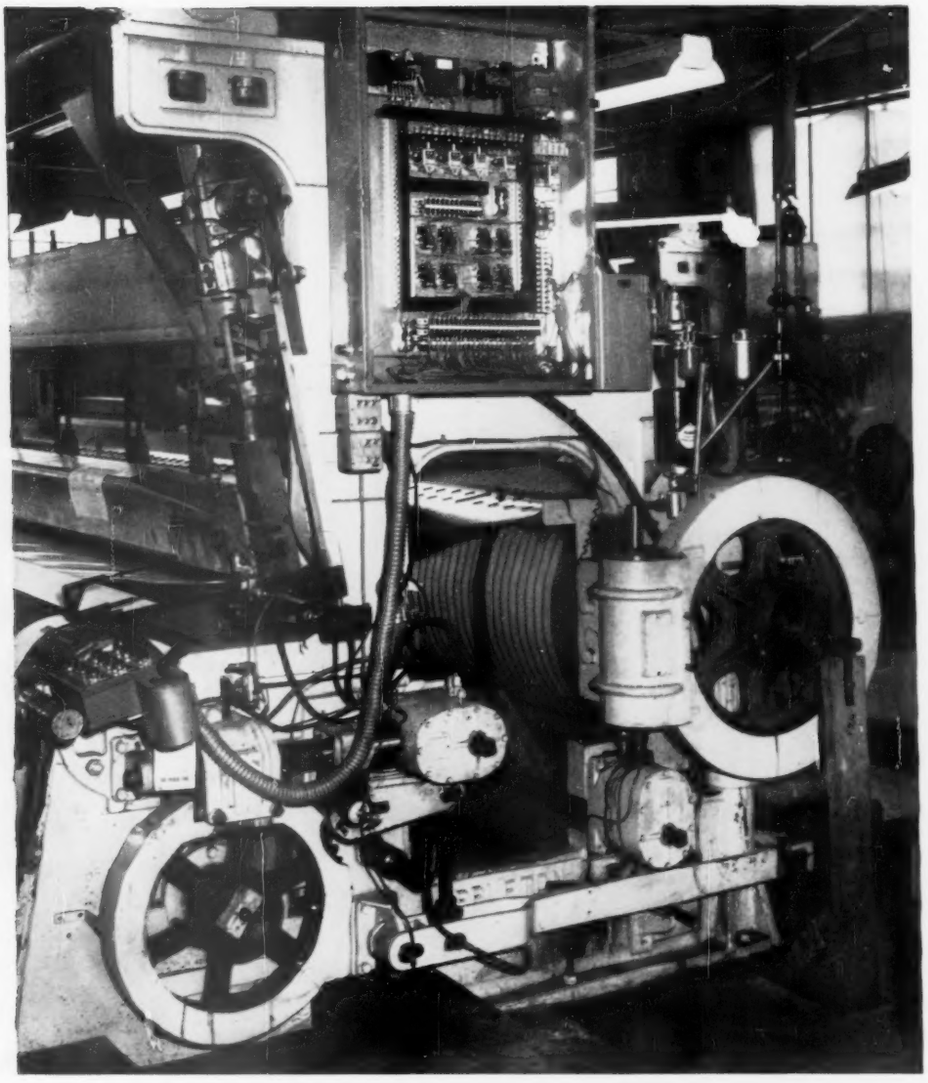

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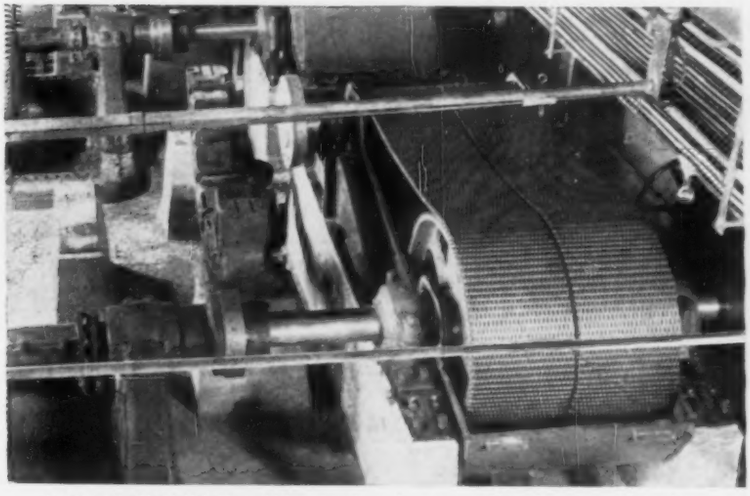

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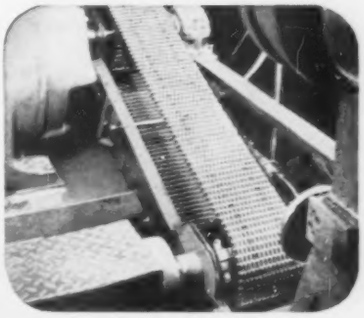

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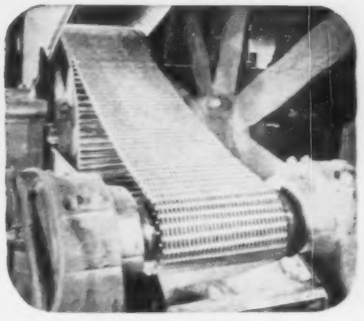

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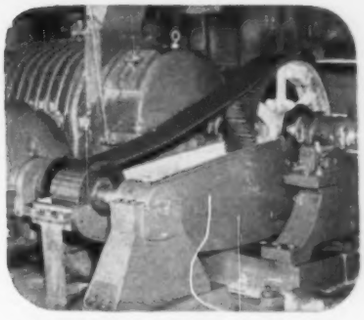

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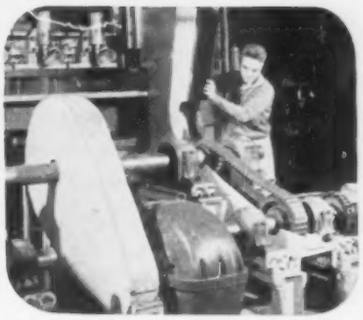

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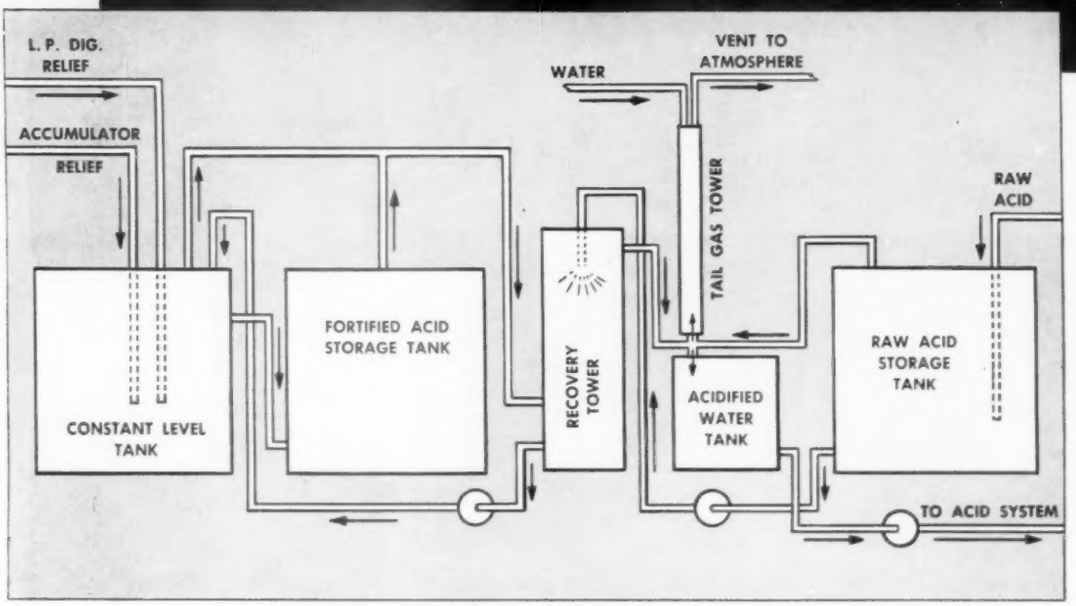

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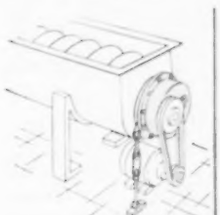

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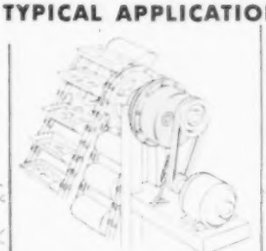

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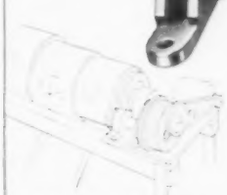

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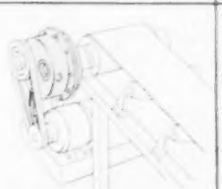

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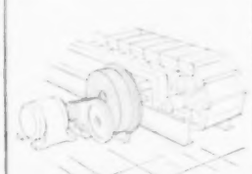

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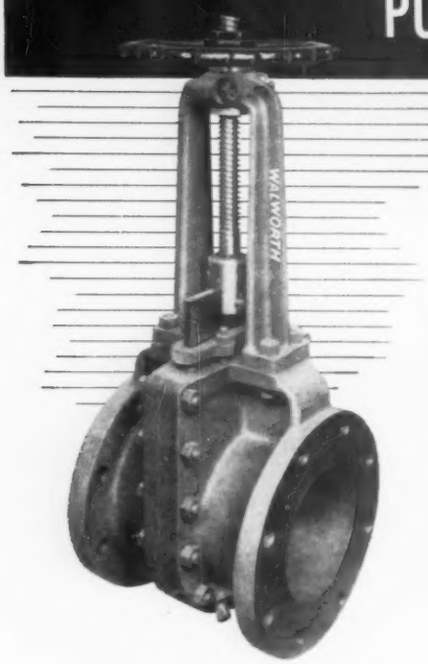


Featuring the No. 757F Pulp Stock Valve!

Here's the valve that was developed especially for clogproof operation on stock lines. There are no recesses where pulp fibers can accumulate. Circular ports permit full flow. The sharp, flame-hardened edge of the semicircular stainless steel gate shears through the pulp stock to a tight, leakproof shutoff.

The No. 757F can be supplied in sizes 4" to 24" inclusive – in All Bronze, Iron Body with Bronze Trim, Iron Body with Stainless Steel Trim, All Stainless Steel construction. Complete information is available from your nearby Walworth Distributor – or – write Walworth direct for a free copy of the booklet, "Walworth Valves for Pulp and Paper Mill Service".

and including these valves for "across-the-board" use!

WALWORTH BRONZE VALVES. These standardized lines of bronze valves provide an unsurpassed system of interchangeability of parts. Drastically reduces inventory problems.

WALWORTH PRESSURE-SEAL CAST STEEL VALVES. Ideal for high-pressure, high-temperature steam and boiler feed service. Internal line pressure is utilized to maintain a tight, leakproof body-to-bonnet connection, reducing bulk and weight of valve.

WALWORTH No. 716 NI-RESIST SADDLE STYLE GATE VALVE. The OS&Y design prevents the fluid in the line from coming in contact with the stem threads. This design meets the requirement for a line of valves in small sizes for pulp and paper mill service.

WALWORTH No. 725FS OS&Y, FLANGED, SPECIAL ALLOY WEDGE GATE VALVES. Designed especially to retard caustic corrosion in the pulp and paper industry.

WALWORTH 928FS SPECIAL ALLOY SWING CHECK VALVES. Designed for the severe corrosive services encountered in the pulp and paper industry.

WALWORTH LUBRICATED PLUG VALVES. Easy turning — quick operating. Lubricant can be renewed while the valve is in service. Lubricant completely surrounds the plug ports assuring a tight seal against leaks.

WALWORTH also offers Plastic Valves and Fittings, and Walseal® Valves and Fittings. Walseal products have factory-inserted rings of silver-brazing alloy in threadless ports.

WALWORTH

Pulp and Paper Mill Division
60 East 42nd Street, New York 17, N. Y.

Walworth Company of Canada, Ltd., Toronto

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

What's the latest on Pulp Bleaching?

It's the narrowing gap between costs of hydrogen peroxide and other bleaching agents! This renews attention to certain well-known advantages of the all-liquid hydrogen peroxide system:

(1) You handle liquids only.

(2) Feeding, control of feeding . . . every aspect of the system . . . can be completely automatic.

(3) Handling hazards are reduced, often with gratifying effect on plant insurance.

(4) You can store hydrogen peroxide in convenient outdoor tanks saving precious indoor storage space.

(5) We'll send you information on all-liquid preparation systems on request.

Becco procedures—many of them patented—are the result of 30 years' research in the application of peroxygen chemicals to American industry.

BECCO CHEMICAL DIVISION
Food Machinery and Chemical Corporation
Station B, Buffalo 7, New York

Buffalo • Boston • Charlotte, N. C. • Chicago
New York • Philadelphia • Vancouver, Wash.

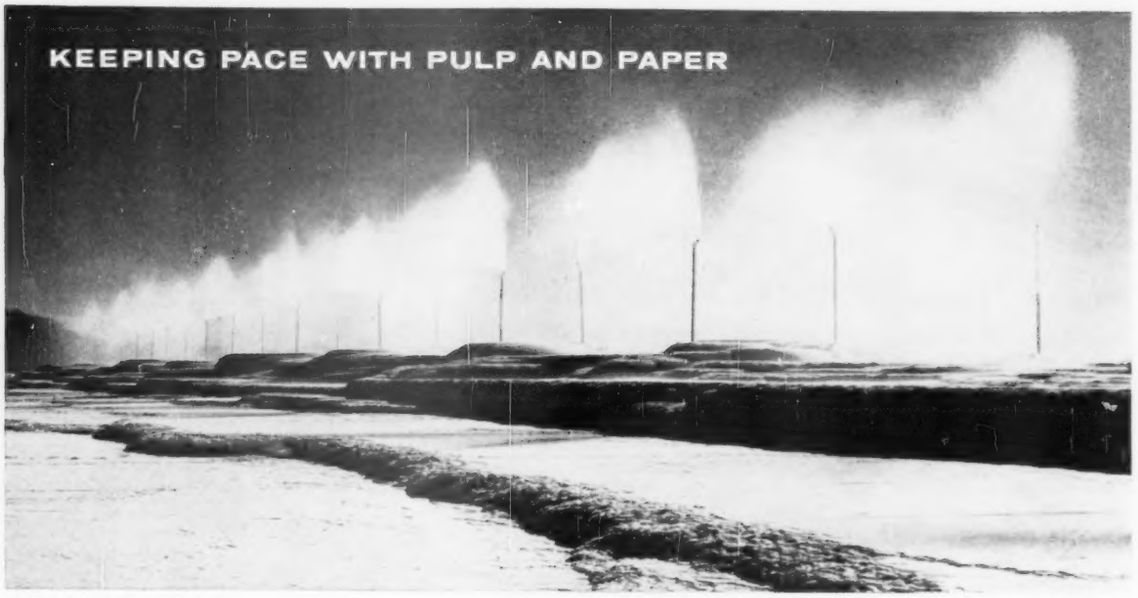
Progress in Peroxygens

BECCO

fmc
FOOD MACHINERY AND CHEMICAL CORPORATION

FMC CHEMICALS INCLUDE: **BECCO** Peroxygen Chemicals • **WESTVACO** Phosphates, Barium and Magnesium Chemicals • **WESTVACO** Alkalis, Chlorinated Chemicals and Carbon Bisulfide • **NIAGARA** Insecticides, Fungicides and Industrial Sulphur • **OHIO-APEX** Plasticizers and Chemicals • **FAIRFIELD** Pesticide Compounds and Organic Chemicals

Spraying Glauber's Salt at Searles Lake, vast natural source of Salt Cake



World Leadership in SALT CAKE

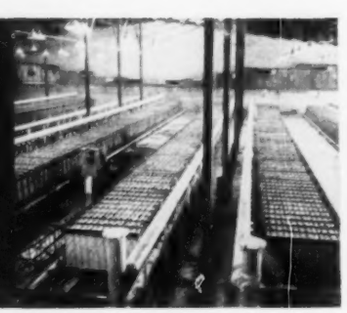
You can count on TRONA to supply your expanded kraft production needs for high purity Sodium Sulphate and Sodium Chlorate. TRONA is basic in both. Salt Cake, from the rich natural brines of Searles Lake, is keeping ahead of production curves wherever high quality kraft paper is produced.

If your interest lies in the SOLVAY high-stage chlorine dioxide pulp bleaching process, you can depend on TRONA* Sodium Chlorate from our large electrochemical facilities at Henderson, Nevada.

Expanded Production of SODIUM CHLORATE

For '58—A New Sodium Chlorate Plant at Aberdeen, Mississippi.

Looking to the future, AP&CC is building a new $5 million Sodium Chlorate plant, with initial production of 15,000 tons per year, at Aberdeen, Mississippi, to serve the expanding Southern pulp industry. When completed in mid-1958, this plant will mark the emergence of American Potash & Chemical Corporation as the largest producer of $NaClO_3$ in the Western Hemisphere.



Electrolytic cells at Henderson

TRONA

American Potash & Chemical Corporation

3030 West Sixth Street, Los Angeles 54, California

LOS ANGELES • NEW YORK • ATLANTA • SAN FRANCISCO • PORTLAND (Ore.)

Export Division: 99 Park Avenue, New York 16, New York

*Trademark AP & CC

Producers of: BORAX • POTASH • SODA ASH • SALT CAKE • LITHIUM • BROMINE • CHLORATES PERCHLORATES • MANGANESE DIOXIDE and a diversified line of specialized agricultural and refrigerant chemicals.

NEW

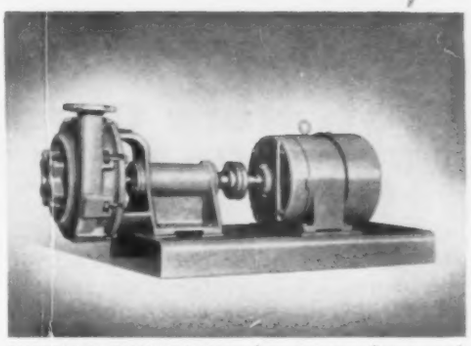
MORRIS TYPE BA

high speed centrifugal slurry pump

fills need for superior abrasive resistance in smaller sizes

The Morris Type-BA slurry pump combines the application of modern hydraulic engineering with simple design and structural strength to achieve superior abrasive resistance. It is available in cast iron, Ni-hard or 316 stainless steel in 1", 1½", 2", 3" and 4" discharge sizes. It features a semi-open impeller, renewable suction lining and quick, easy dismantling and reassembly.

This new, competitively-priced high speed slurry pump was developed by the world's foremost manufacturer of heavy-duty dredging, hydraulicking and industrial slurry pumping equipment. It is designed to handle chemical process slurries and suspensions of sand, coal, crystals, silt, sludge and lime. Its compact but rugged construction assures dependable 24-hour duty in abrasive process handling.



FOR FURTHER INFORMATION and engineering drawings of the Type BA series, write for Bulletin 188.

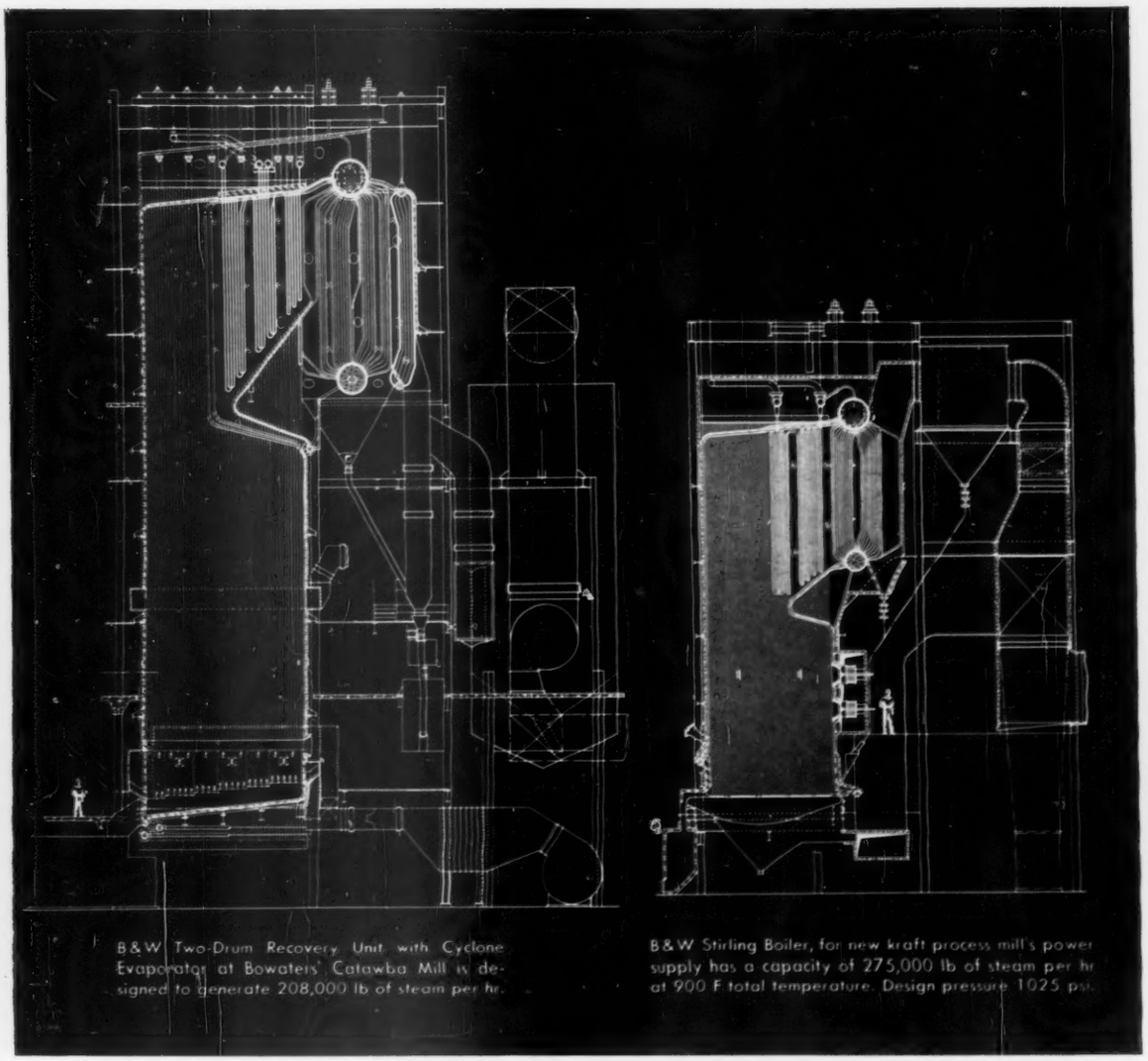
MORRIS CENTRIFUGAL PUMPS

MORRIS MACHINE WORKS

BALDWINSVILLE, N. Y.

Sales Offices in Principal Cities

Export Office: 50 Church Street, New York 7, N. Y.



B&W Two-Drum Recovery Unit with Cyclone Evaporator at Bowaters' Catawba Mill is designed to generate 208,000 lb of steam per hr.

B&W Stirling Boiler, for new kraft process mill's power supply has a capacity of 275,000 lb of steam per hr at 900 F total temperature. Design pressure 1025 psi.

For Maximum Efficiency in Chemical and Heat Recovery

Bowaters Carolina Corporation Installs B&W Recovery Unit

Bowaters Carolina Corporation and Bowaters Research and Development Inc. have selected a B&W Recovery Unit and a B&W Power Boiler for the new Bowaters kraft mill at Catawba, South Carolina.

The 450-ton recovery unit will operate at 825 psi and 825 F at the superheater outlet. It embodies B&W's well-known conservatively designed furnace, nose baffle, and multipass boiler. Final evaporation of black liquor will be accomplished in a B&W Cyclone Evaporator.

The power boiler is a two-drum, single-pass unit to burn bark, oil, gas, or bituminous coal. Both units are equipped with B&W Cyclone Steam Separators to assure a continuous supply of clean, dry steam.

B&W can help you select the right recovery or power boiler for your mill conditions. Write to The Babcock & Wilcox Company, Boiler Division, 161 East 42 Street, New York 17, N. Y.

P-809

BABCOCK & WILCOX

BOILER DIVISION

SOLAR BLUES

BRIGHT
FAST
UNSURPASSED
FOR TINTING
WHITE
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From Research to Reality

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A SALES DIVISION OF

GENERAL ANILINE & FILM CORPORATION

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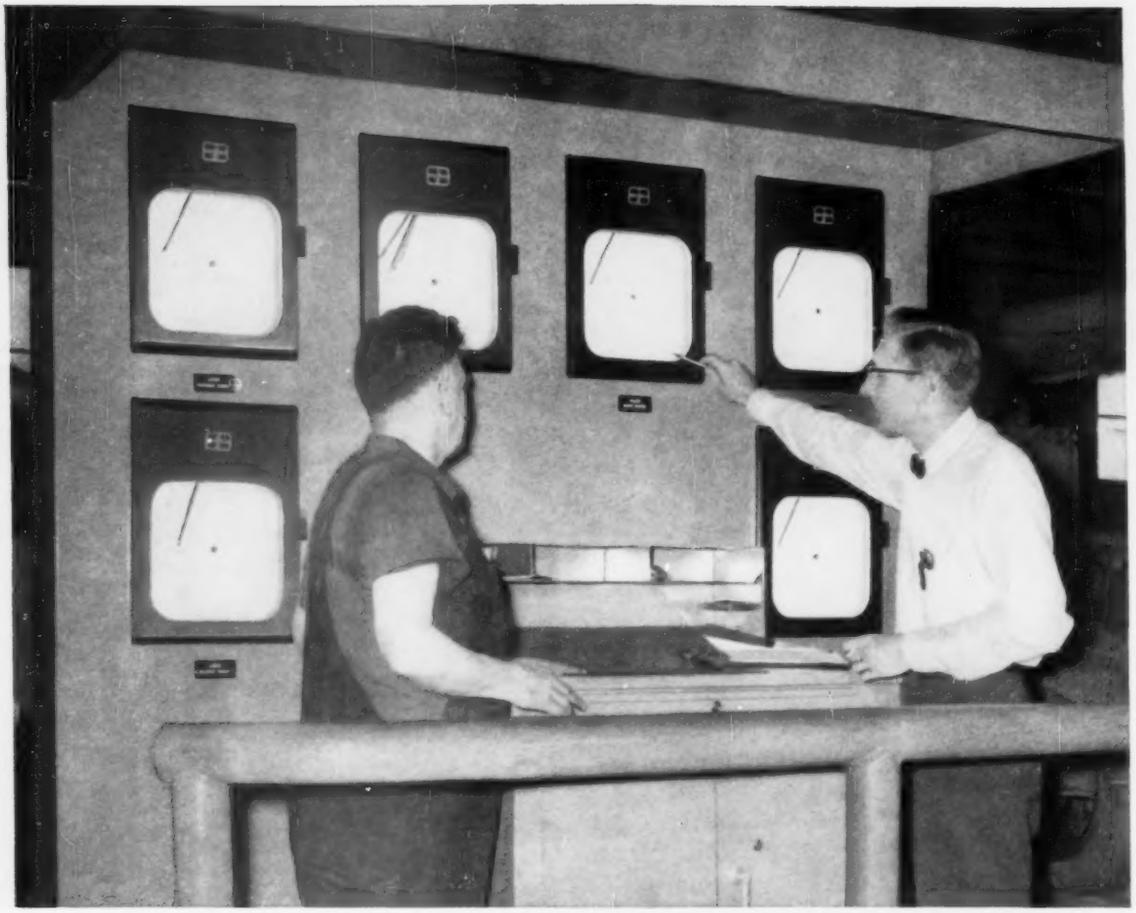
SOLAR BLUE DYES MANUFACTURED BY THE GENERAL ANILINE & FILM CORPORATION ARE SOLD OUTSIDE THE UNITED STATES UNDER THE TRADEMARK "TINTOSOL."



BRISTOL LIQUID LEVEL RECORDERS at Yorktowne Paper Mills, Inc., York, Pa.

CRITICAL PRODUCTION PROBLEMS

. . . get quick solution with Bristol instruments

THESE BRISTOL THICKNESS RECORDERS continuously check Insulite* fibre board at Minnesota & Ontario Paper Co.'s International Falls, Minn., mill.
**Reg. Trade Mark of Minnesota and Ontario Paper Co.*

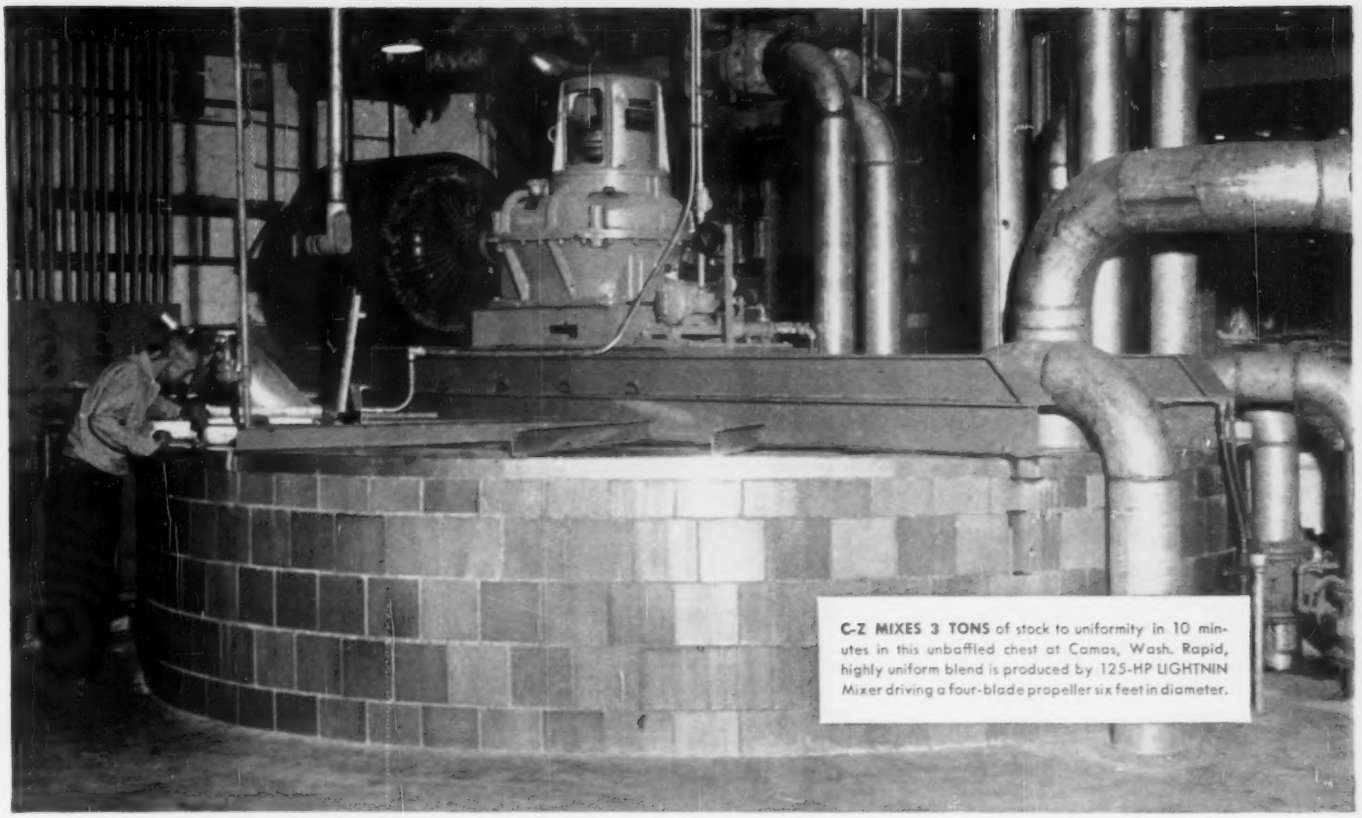
Take, for example, the Yorktowne Paper Mills, Inc., York, Pa., makers of high-quality boxboard for a wide variety of folding and set up boxes. To meet contract commitments, the product being run off their production lines must be changed up to five or six times a day. To avoid costly shortages or overruns, Yorktowne needs exact knowledge of stock levels in "liner" and "filler" chests. The answer: Bristol Series 500 Liquid Level Recorders *(above)* give production men instant, up-to-the-second stock level data.

Or take the Insulite Division of the Minnesota & Ontario Paper Co., located at International Falls, Minn. Thickness of Insulite* building and decorating board is of vital importance both for operating economy and customer satisfaction. The Bristol Series 500 Thickness Recorders *(left)* were the answer. With this continuous thickness record before them, operators can adjust stock feed and other machine controls to get exactly the thickness desired. (Incidentally, Minnesota & Ontario is also using Bristol instruments to control pH, kraft and sulfite digestion and liquid level.)

Let a Bristol man tell you how Bristol instruments can solve your production problems with measurement, indication, recording or automatic control. They can handle almost any quantity—pH, liquid level, flow, concentration of bleach liquor, draw speed on paper machines, thickness and many others. Write The Bristol Company, 142 Bristol Road, Waterbury 20, Conn. 7.39

BRISTOL TRAIL-BLAZERS IN PROCESS AUTOMATION

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS



C-Z MIXES 3 TONS of stock to uniformity in 10 minutes in this unbaffled chest at Camas, Wash. Rapid, highly uniform blend is produced by 125-HP LIGHTNIN Mixer driving a four-blade propeller six feet in diameter.

New mixing unit puts **accuracy** *into Crown Zellerbach stock chests*

How can you minimize the effect of changes in stock consistency?

Here's how Crown Zellerbach does it, with a 125-horsepower LIGHTNIN Mixer, on No. 9 Mixing Chest at the company's large Camas, Wash., mill.

Mixes 3 tons in 10 minutes

This chest handles 25 batches or 75 tons of 3½-4% stock per 24-hour day. Furnish usually consists of groundwood and special bleached stocks of varying consistencies. Cycle allows 30 minutes for filling the chest, only 10 minutes for blending, 10 minutes for pumping out to the first beater chest.

In 10 minutes or less, the LIGHTNIN Mixer equalizes three tons of stock and *keeps* it equalized. During blending, *uniformity of stock varies less than 0.2% between any two points in the chest at any time.*

No guesswork

This high uniformity eliminates "ups and downs" in consistency of stock leaving the chest. It insures most uniform possible feed to the beater system. A consistency regulator is used to control finished batch before stock is discharged to chest.

Measurable results

Want to get performance like this out of your chests? Put LIGHTNIN Mixers into them. Get *results you can measure*—in terms of uniform stock, shorter blending time, tighter control of color, less machine downtime.

For the facts on stock-chest mixing that does what you want it to do, call in your LIGHTNIN Mixer representative. You'll find his name in Thomas' Register. Or write us direct.

"Lightnin® Mixers"

MIXCO fluid mixing specialists

FOR LATEST MIXING INFORMATION and full description of LIGHTNIN Mixers, send for these helpful bulletins:

- ☐ B-102 Top or bottom entering; turbine, paddle, and propeller types: 1 to 500 HP
- ☐ B-103 Top entering; propeller types: ¼ to 3 HP
- ☐ B-108 Portable: ⅛ to 3 HP
- ☐ B-104 Side entering: 1 to 25 HP
- ☐ B-112 Laboratory and small-batch production types
- ☐ B-109 Condensed catalog showing all types
- ☐ B-111 Quick-change rotary mechanical seals for pressure and vacuum mixing
- ☐ Paper stock mixing data sheet for figuring mixer requirements

Check, clip, and mail with your name, title, company address to:

MIXING EQUIPMENT Co., Inc., 141-a Mt. Read Blvd., Rochester 11, N.Y.

In Canada: Greey Mixing Equipment, Ltd., Toronto 10, Ont.

IN BEATER CHEST or machine chest, you can bring stock to full uniformity in as little as 6 minutes with a LIGHTNIN. You can get uniform color dispersion in as little as 2 to 3 minutes.

"FLEXIBLE" PLANT HEATING BY "BUFFALO"

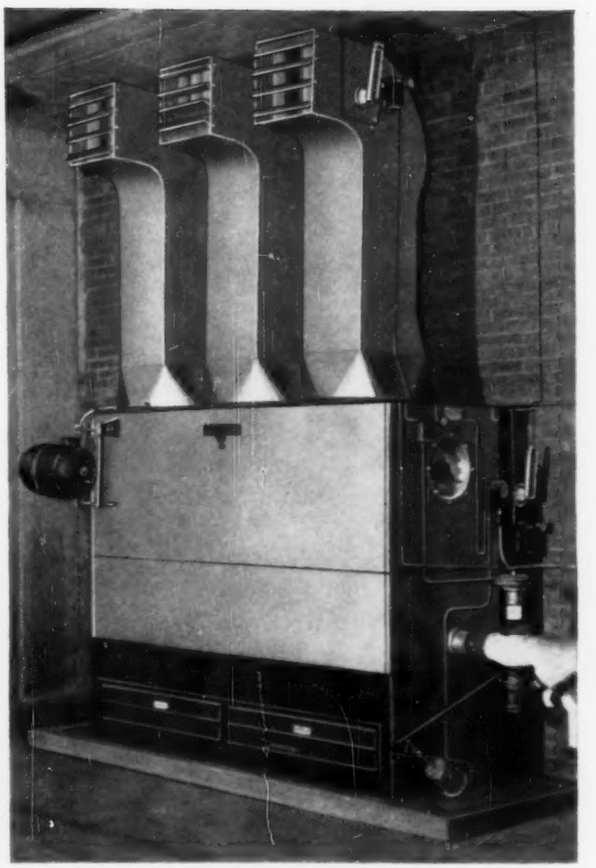
IS ECONOMICAL - SAVES PRODUCTIVE FLOOR SPACE

- **Easy, Fast Installation**
- **Quiet, Efficient Operation**
- **Quick, Easy Maintenance**
- **Long, Trouble-Free Life**

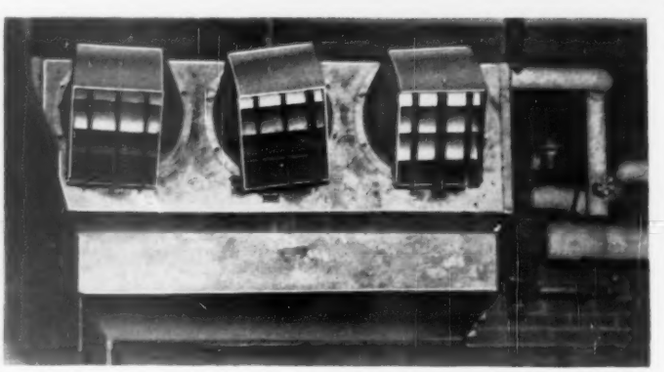
"Buffalo" Unit Heaters are compact, versatile, practical . . . easily adaptable to any and all of your plant heating and ventilating needs.

If your heating requirements are localized, you can use one or more "Buffalo" Unit Heaters of correct capacity to supply warm air or ventilation to a certain specific area in your plant. Or, you can use a battery of these flexible units to heat your entire plant . . . economically and efficiently.

Here are some of the many unique advantages you will find in "Buffalo" Unit Heaters: non-freeze "Aerofin" coils radiate maximum heat, permit space-saving design. Sectionalized construction speeds installation. Easily-accessible, standardized parts — plus outside-lubricated fan bearings — facilitate maintenance. Smooth, quiet, efficient "Buffalo" fans insure optimum heat. Swivel outlets aim air-flow where it's needed. Heavy-duty paneling, fans, swivel outlets, coils and bearings insure long life with minimum attention. "Q" factor construction — the built-in Quality that provides trouble-free satisfaction and long life is in every "Buffalo" product.



Compact "Highboy" Unit Heater for Low Ceiling Areas.



Suspended "Lowboy" Unit Heater Requires No Floor Space

For full details on "Buffalo" Unit Heaters, contact your nearest "Buffalo" Engineering Representative — or write for Bulletin 3704A.

"Buffalo"

BUFFALO FORGE COMPANY

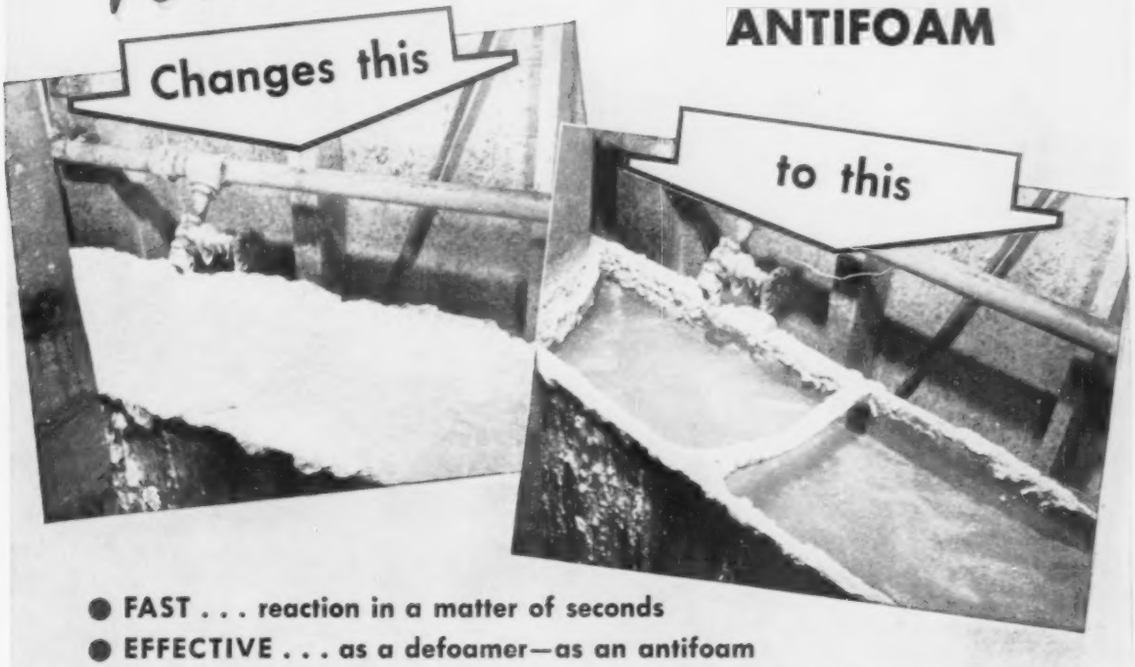
Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING
FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Nalco 71-B

LIQUID ANTIFOAM



- **FAST . . . reaction in a matter of seconds**
- **EFFECTIVE . . . as a defoamer—as an antifoam**
- **FAR MORE ECONOMICAL . . . than paste or briquette**

Here is what happened when *liquid* Nalco 71-B was tried in a well-known mill plagued with the foaming problem of high-resin pulp.

At a cost of only *one-sixth as much* as the previous antifoam, the mill reported Nalco 71-B *eliminates all foam in seconds!* Sheet quality remains high, and production stoppages and slow-downs due to foaming have been eliminated. Fibre loss to sewers is extremely low and cleaning of cell room and screens has been substantially reduced. Small wonder the mill continues to use Nalco *liquid* 71-B in both primary and secondary pulp screen processes.

There is a whole series of Nalco antifoams designed to get *results* like this in your mill. Ask your Nalco Representative about them, or write direct to Nalco.

NATIONAL ALUMINATE CORPORATION
Telephone: POrtsmouth 7-7240
6213 West 66th Place • Chicago 38, Illinois
CANADA: Alchem Limited, Burlington, Ontario
NORTHWESTERN UNITED STATES, HAWAII and ALASKA
The Flox Company, Inc., Minneapolis 3, Minnesota
ITALY: Nalco Italiana, S. p. A. SPAIN: Nalco Espanola, S. A.
WEST GERMANY: Deutsche Nalco-Chemie GmbH

THE Nalco® SYSTEM...Serving the Paper Industry through Practical Applied Science

ORISKANY'S "3-way Service"

helps you get longer felt life!

Design Service

You can't put a truck tire on a bicycle and expect it to operate efficiently! At Oriskany, we start *right* . . . with the *right felt design*. Our technical engineers and our production staff analyze your requirements for finish and drainage and fibre strength, and then they design your felt with the proper characteristics for your particular machine operation. Result: More uniform paper products — better quality.

Laboratory testing Service

With our specially-designed testing equipment, we can determine from swatches of your felt whether your press rolls are causing uneven wear. Our chemists can tell you whether bacterial damage or chemical deterioration is reducing felt life, and we can recommend one of our exclusive chemical treatments to combat unusual conditions. Oriskany's laboratory analysis service can help you prolong felt life and reduce your operating costs.

Field engineering Service

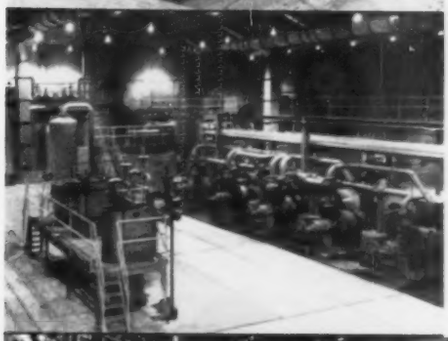
If you want on-the-spot evaluation of your felt problem, we will arrange to have our competent Service Engineer visit your mill. He will make a thorough investigation and report his findings to our team of technical people. When they have all the facts, they are eminently successful in solving unique problems. Their combined experience is at your service.

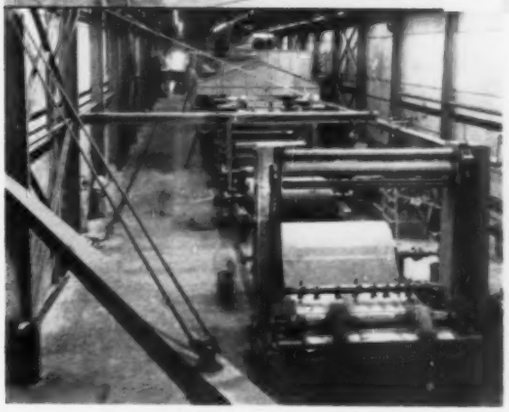
First choice-because They last

Oriskany

WATERBURY FELTS

H. WATERBURY and SONS COMPANY • ORISKANY, NEW YORK





U. S. Gypsum's fine new plant, built and operating within a tough, 9-month schedule

RESULTS!

clients who are merely satisfied disappoint us!

UNITED STATES GYPSUM COMPANY

300 WEST ADAMS STREET • CHICAGO 6 • ILLINOIS

May 18, 1956

Mr. Herman Brown, President
Brown and Root, Incorporated
Post Office Box Three
Houston 1, Texas

Dear Mr. Brown:

We wish to extend to you and your Company our appreciation for your splendid performance in the construction of our new Paper Mill at Galena Park, Texas. Not only was the unusual construction schedule of nine months met, but the quality of the design, materials and construction was excellent.

Especially commendable was the cooperation that was manifested by all of the members of your organization connected with this project. It was this spirit of teamwork that resulted in this outstanding accomplishment.

With kindest personal regards,

Yours very truly,
UNITED STATES GYPSUM COMPANY

H. C. Bear
Vice-President - Purchasing

HCB pf

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BROWN & ROOT, LTD., Edmonton, Alberta, Canada
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BROWN & ROOT, INC.
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CABLE ADDRESS—BROWNBILT
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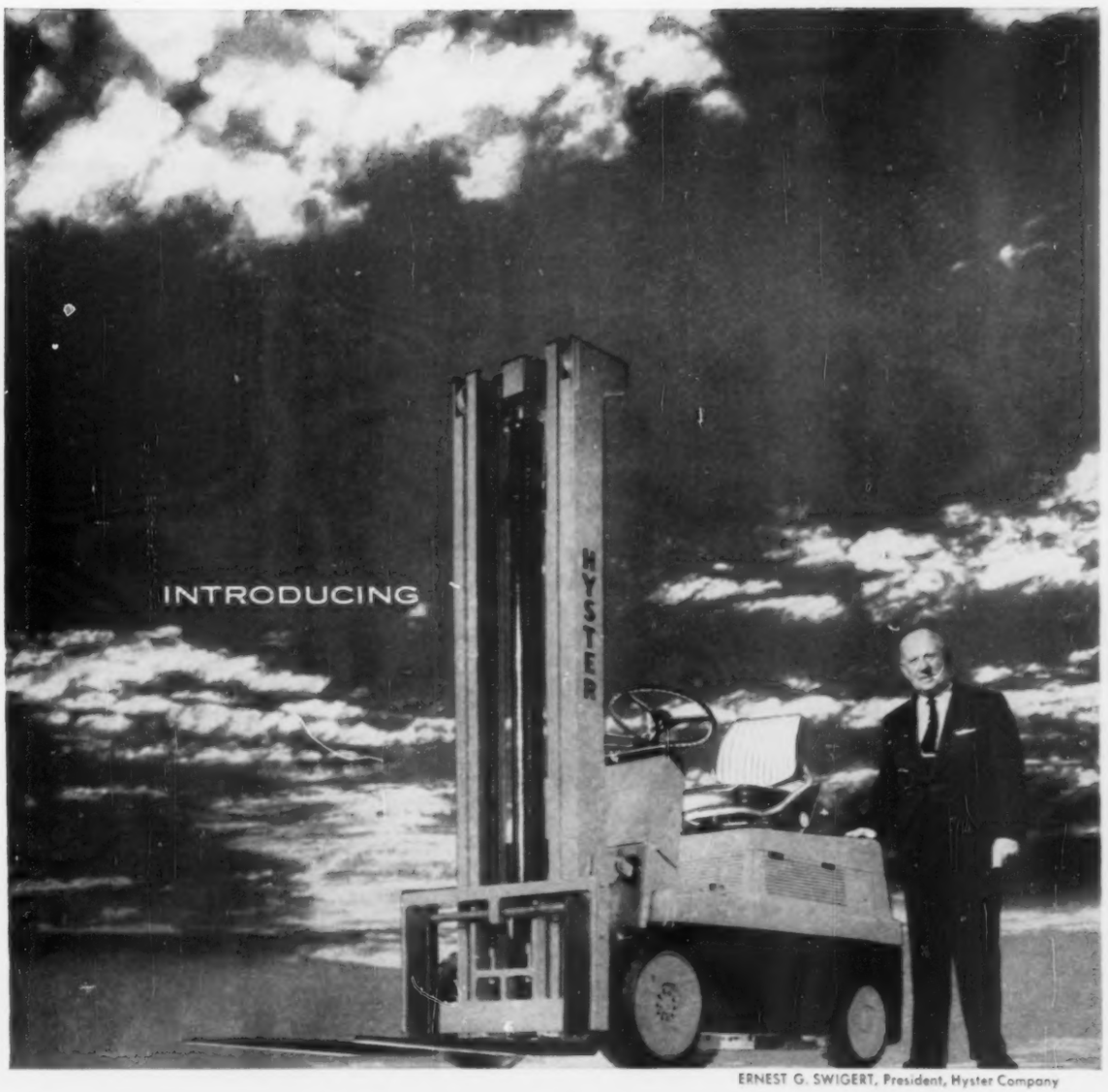
LET MANCHESTER

Help you plan your next Dryer Installation

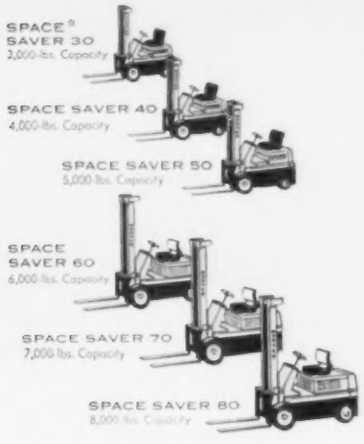
Consider these points on Manchester dryers and dryer sections . . .

- Dryers are made of close grained cast iron and designed to meet required operating pressures.
- Uniform, accurate wall thickness assures proper heat transfer over complete dryer face.
- Code tested to required operating standards.
- Supplied with journals for plain bearings or for anti-friction bearings.
- Dryer faces precision ground and polished.
- Dryers are of bolted head construction, manufactured in 36", 42", 48", and 60" diameters—face length up to 165".
- Manchester also can supply complete dryer sections engineered to your special requirements — including felt rolls, felt stretch mechanism, and complete auxiliary equipment.
- Let us submit proposals for complete dryer sections or individual dryers. No cost or obligation.

The Manchester Machine Co.
MIDDLETOWN, OHIO
SPECIALISTS IN DESIGNING AND BUILDING PAPER MILL MACHINERY



ERNEST G. SWIGERT, President, Hyster Company



Functionally styled by Henry Dreyfuss.

THE FINEST CUSHION TIRE LIFT TRUCKS EVER BUILT

SPACE SAVER 60 SPACE SAVER 70 SPACE SAVER 80

This new series of cushion tire lift trucks is the crowning achievement of the finest engineering, industrial design and testing available today. The joint planning of Hyster engineers and Henry Dreyfuss, industrial designer, results in a series of 6,000, 7,000 and 8,000 lb. capacity trucks unequalled for productive maneuverability, operating economy and handling efficiency.

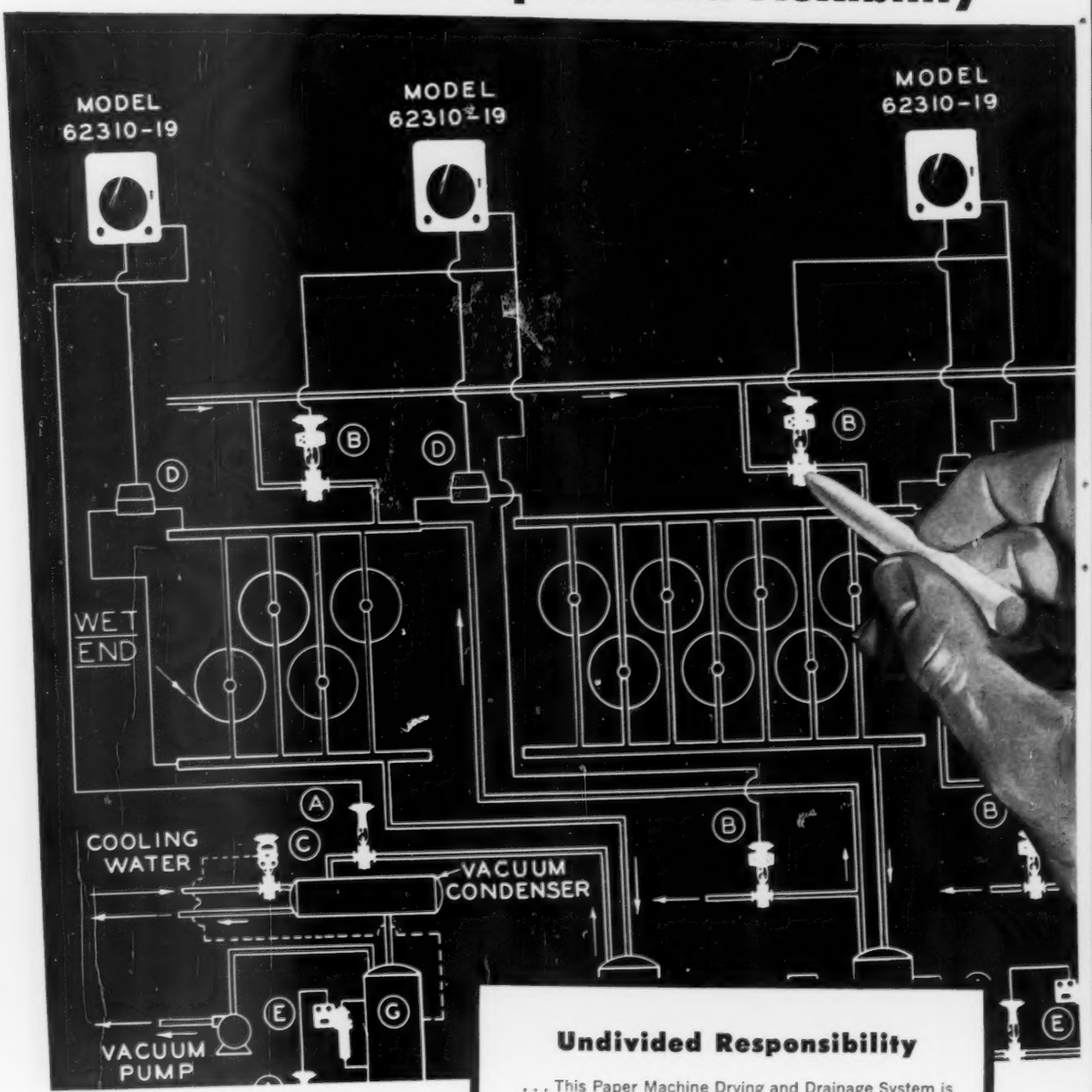
Prove to yourself why we say these trucks are, without question, the finest cushion-tire lift trucks ever built. Schedule a demonstration at your own plant, or see them today at any Hyster dealer store.

HYSTER®

World's foremost manufacturer of Industrial Trucks

Factories: Portland, Oregon • Danville, Illinois
Peoria, Illinois • Nijmegen, The Netherlands
Sao Paulo, Brazil • Glasgow, Scotland
Sydney, Australia (licensee)

Increase Machine Speed and Flexibility



Undivided Responsibility

. . . This Paper Machine Drying and Drainage System is engineered as a complete package, combining all the required components into a proven, dependable system.

- Control Valves
- Level Controls
- Pumps
- Condensers
- Control Instruments
- Pressure Transmitters
- Separator Tanks
- Installation Supervision
- World-wide Service

with Masoneilan Drying-Drainage System

Improvement in heat transfer provides fully uniform sheet drying even at high machine speeds, plus extra bonus of steam economy.

Masoneilan Drying and Drainage Systems are designed to provide the optimum degree of heat transfer within the drier sections. Result: Complete flexibility in selection of machine speeds, more uniform sheet drying and increased over-all capacity.

The key to this efficiency is the *continuous* purging of *both* condensate and non-condensables, by maintaining adequate differential pressures across drier sections — assured by the Masoneilan Blow-Through System. Drier sections are rapidly cleared of non-condensables during start-up; and excess steam is relieved during radiation loads. In addition, steam is more fully utilized by cascading from dry to wet end sections in each drier group.

Send for Special Bulletin on Paper Machine Drying and Drainage Systems. Make it your first step towards improving paper quality, increasing production and achieving new steam economies.

Send for it, today.

MASON-NEILAN

Division of Worthington Corporation

27 NAHATAN STREET, NORWOOD, MASSACHUSETTS

SEVENTY-FIFTH 75 ANNIVERSARY 1881 1956

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Albuquerque • Charlotte • Los Angeles • Corpus Christi • Denver • Appleton • Birmingham • Pittsburgh
New Orleans • Seattle • Jacksonville • Wilmington • Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

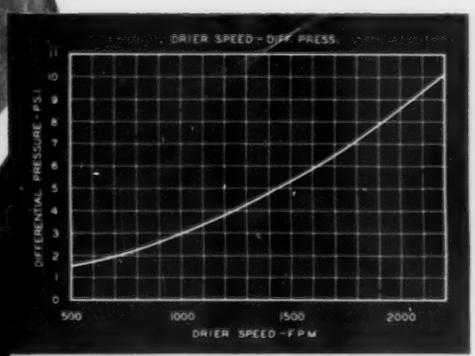


Fig. 1 indicates what minimum differential pressures are generally necessary to properly evacuate a 60" diameter drier. This is an empirical curve, but experience proves it reliable.

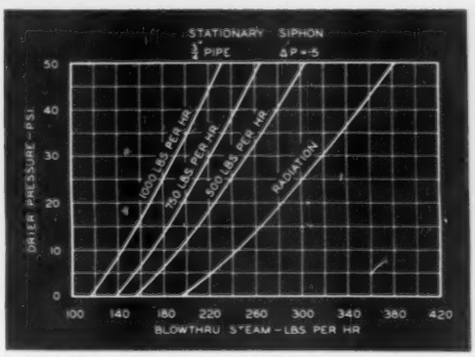
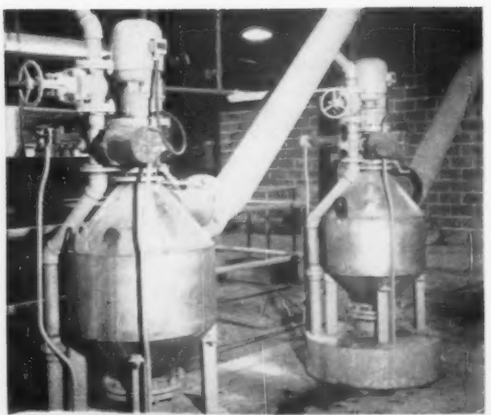
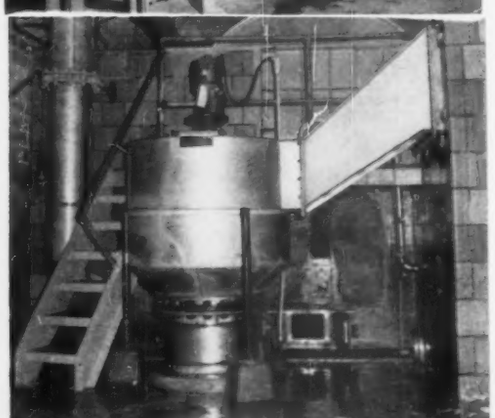
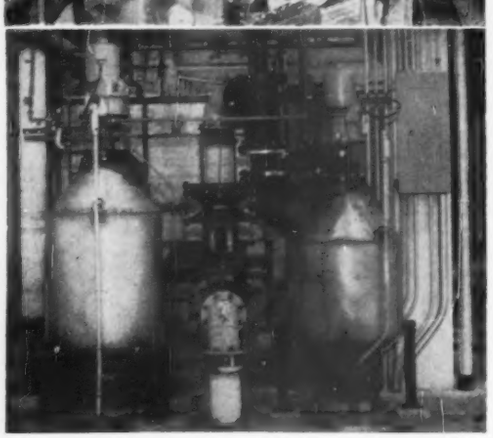


Fig. 2 shows the considerable difference in the quantity of blow-through steam when a drier is condensing and when under radiation load. These curves are also derived in an empirical manner.

MN7-34







VARIATION:

± .02%

DIRECTLY AHEAD OF PAPER MACHINES *with*

DeZurik

AUTOMATIC - RECORDING STOCK CONSISTENCY REGULATORS

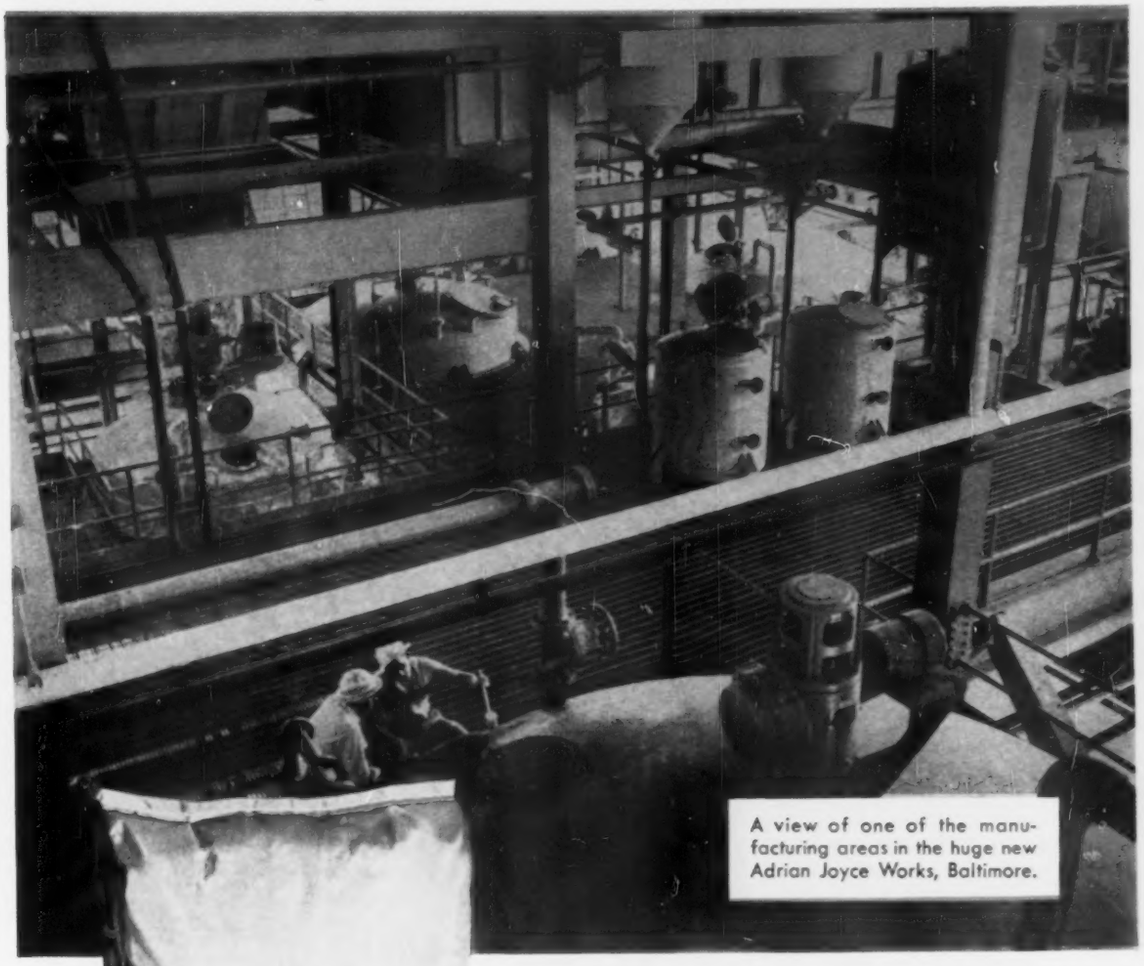
Without constant attention—without costly maintenance—under the most severe conditions, DeZurik Stock Consistency Regulators never vary in performance. They're guaranteed to hold consistencies within limits of plus or minus .1%, and many of them installed directly ahead of paper machines are holding consistencies to plus or minus .02%.

Three basic types adapt to a wide variety of installations such as regulating stock after high density pulp storage chests, after dry broke pulpers, couch pit wet broke control, brown stock washing systems, basis weight control, stock metering systems and refining systems.

Because quality control is so essential in your plant, let us show you how DeZurik Consistency Regulators provide dependable, accurate, automatic service.

DeZURIK CORPORATION
SARTELL, MINNESOTA

From the industry's most advanced pigment plant comes...



A view of one of the manufacturing areas in the huge new Adrian Joyce Works, Baltimore.

ZOPAQUE®
TITANIUM DIOXIDE

. . . the whitest white pigment available!

You can count on Glidden to supply your complete titanium dioxide requirements. Our new Adrian Joyce Works at Baltimore more than doubles the available supply of *Zopaque* Titanium Dioxide. Further plant expansions are now being made to help meet your growing needs in the years to come!

Zopaque gives you these advantages:

- Highly accelerated dispersion rate.
- Exceptional hiding power.
- Outstanding gloss and color retention.
- Low reactivity.
- Rutile and Anatase grades.

By the makers of SUNOLITH Lithopones and EUSTON White Lead

THE GLIDDEN COMPANY

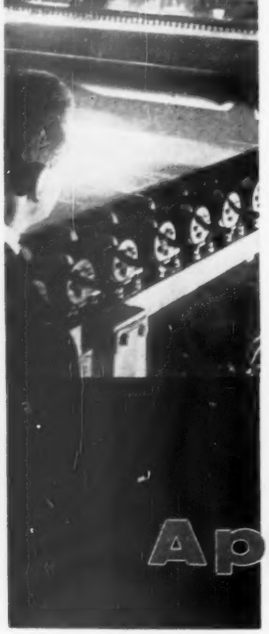
Chemicals - Pigments - Metals Division

BALTIMORE, MARYLAND • COLLINSVILLE, ILLINOIS • HAMMOND, INDIANA • SCRANTON, PENNSYLVANIA

Felt making starts here ...with a superintendent, a paper machine, and the Appleton man.

Periodic refresher courses keep your Appleton man informed on the latest developments in felt technology...

...which he brings to you and your specific problems of felt application and performance.



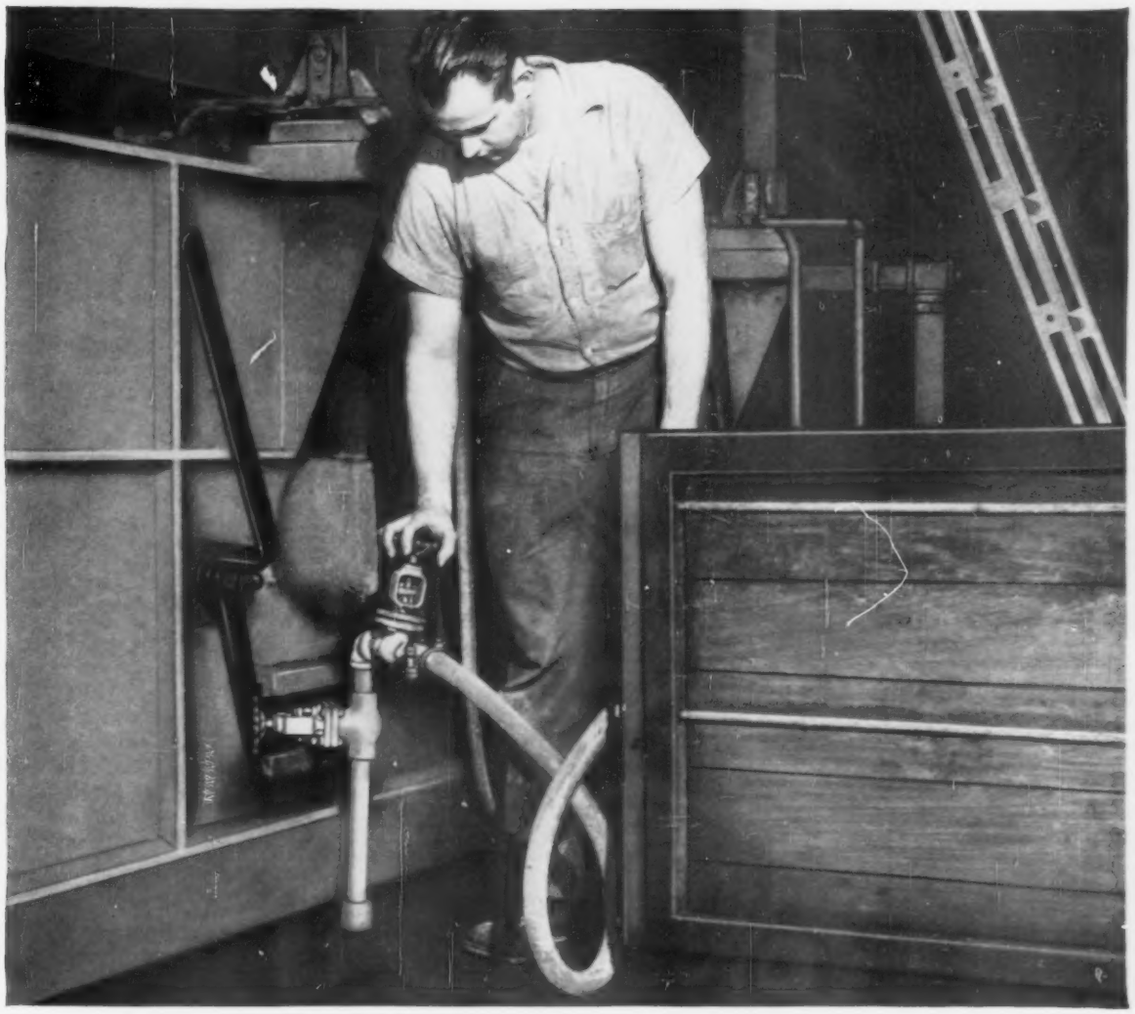
No vacation, this, but the start of a 12-hour workday...par for the five-day course on felt design and manufacturing which your Appleton man takes each year.

And this is a picture of applied research. Your Appleton man is reviewing problems encountered in the field with our research and technical people. He is seeking—and getting—practical answers to your problems of felt application and performance.

All of which adds up to the fact that the time you spend with your Appleton man is time well spent. Appleton Woolen Mills—*working with the paper industry*—Appleton, Wisconsin.

Appleton felts

Board mill finds the way to a lower-cost valve operation



Crane valve quadruples service life on corrosive steam*

At Gardner Board and Carton Company's Lockland Mill in Cincinnati, Ohio, this ¾" Craneloy 20 globe valve has lasted four times longer than other makes.

The valve installation is on a 150 psi. steam line to a siphon tank of 66° Baumé sulphuric acid, which is mixed with the steam to spray ink off screens in a wet end process. Occasionally the siphon line is left in the vat—causing condensation which forms a vacuum, pulling acid back into the line and through the valve.

Before switching to Crane, Gardner was replacing brass valves every week because of corrosion. Then they tried a special alloy valve of another make. It lasted 12 weeks. The three Crane valves used in this service have already lasted a year and are still closing tight and sure.

You, too, can reduce valve maintenance costs and production downtime. Ask your Crane Representative.

**This Craneloy 20 valve is not ordinarily recommended for steam, but here the sulphuric acid mixture provides enough lubrication to retard galling.*

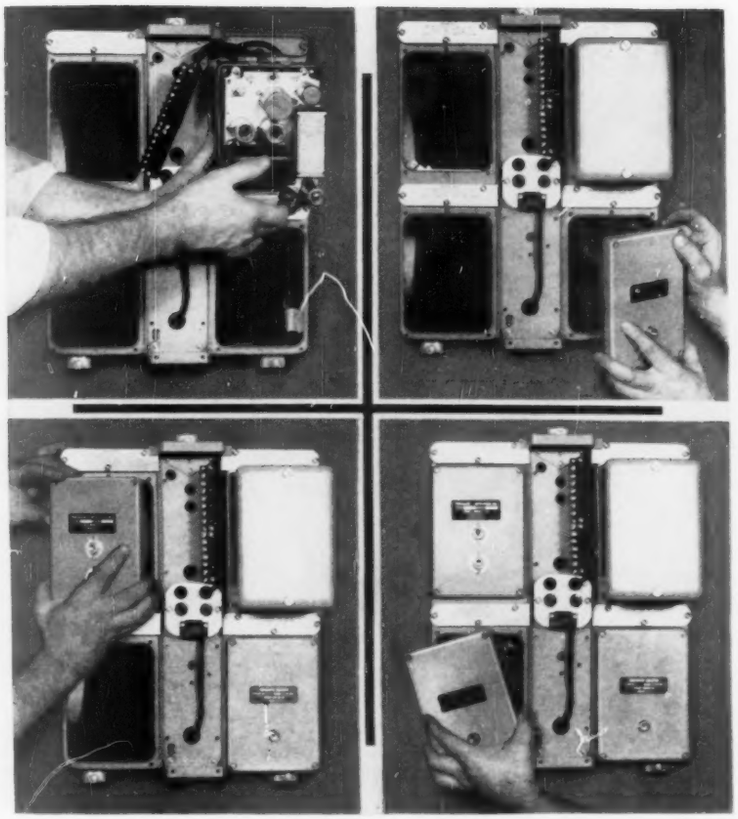
ASK YOUR Crane Man for a copy of "Valve Performance Facts," 32 case histories showing how to cut valve costs.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

CUSTOM BUILD your own Bailey Recorder



These four views of the back of a Bailey Recorder show how four plug-in units may be added as needed to meet almost any recorder application.

The freedom and flexibility of "do-it-yourself" instrumentation is yours in the Bailey Recorder. A variety of plug-in units make it possible to record, control, and retransmit any variable that can be converted to a pneumatic or electric signal.

The basic plug-in units are the Bailey a-c and d-c Electronic Receivers and Pneumatic Receivers. Any four of these may be used in one recorder, intermixed in any way, to provide four continuous records on one chart.

For automatic control, other plug-in units are available.

For square root extraction or linear integration, there are two plug-in variations of the Bailey Integrator.

When you want a pneumatic signal that varies according to a pre-set pattern plug in a Bailey Program Controller.

Periodic running time of a condition or process is recorded on the chart when a Bailey Running Time Recorder is used.

These and other plug-in units are described in Product Specification E12-5. Some companies stock Bailey Recorder cases and assorted plug-in units. As instrumentation and control needs arise they build up the kind of recorder-controller required, using the proper plug-in units from stock. Unmatched versatility such as this means lower instrumentation costs.

For the complete story of how easily you can custom build this recorder to your needs, see your Bailey Engineer. G43-1

Instruments and controls for power and process

BAILEY METER COMPANY

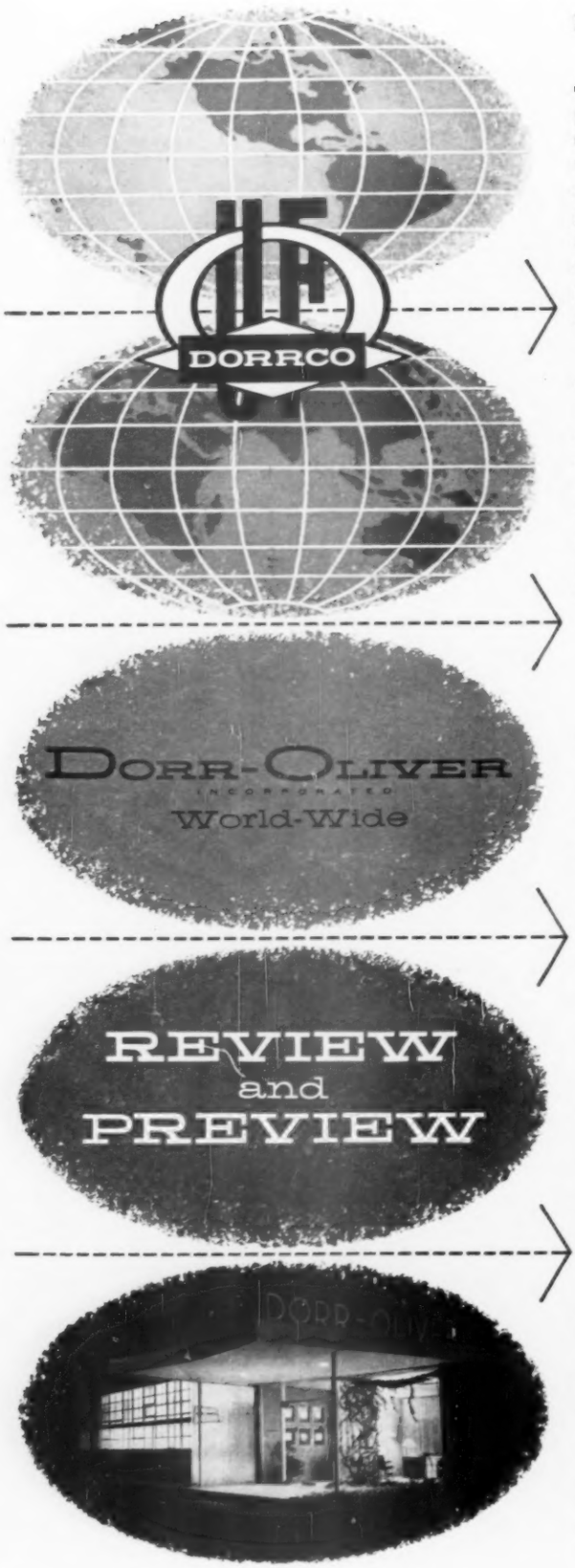
1037 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

World-famous Radio City Music Hall Rockettes

PUGET PULP IS UNIFORM

PUGET SOUND PULP and TIMBER CO.
BELLINGHAM • WASHINGTON



1957 has been a year of contrasts.

Significant advances in technology, the completion of a substantial portion of our program to expand our productive capacity in the U. S. and Canada and the strengthening of our marketing organization are all tangible achievements which will bring us both immediate and long-term benefits. On the other hand, a generally lower activity in new projects coming in has emphasized the narrowing profit margins faced by most businesses and points up our insistence on improving designs, reducing costs and increasing efficiencies.

Abroad, the picture is bright. Our subsidiaries report current high levels of business and there is great optimism for the future. Of particular interest is the success of our newest family member, Dorr-Oliver Pty. Ltd. of Australia, which opened its doors on January 1 of this year and by mid-year had far surpassed expectations. Growth of Dorr-Oliver (India) Ltd., another of our newer associates, has also been noteworthy, with the recent addition of local manufacturing facilities justifying still greater optimism.

SUGAR — In 1957 a total of 42 RapiDorr Clarifiers and 48 Oliver-Campbell Cane Mud Filters were sold to the cane sugar industry. A significant aspect of this outstanding record has been the increasing participation of our subsidiaries and representatives abroad. They are locally manufacturing, in some instances for the first time, 31 of these machines in Argentina, Brazil, England, France, Germany, India, the Philippines and South Africa.

POLYETHYLENE — The first Merco Pressure Centrifuges went into operation early last year removing catalyst from liquid polyethylene at capacities considerably in excess of original expectations. Overseas, British, Italian and German producers ordered Pressure Centrifuges for similar application in both new commercial scale and pilot plants.

SANITATION — One of the highlights of the year was D-O activity in the waste water disposal field. Four major new developments—all ideally suited for smaller plants—were introduced. The SpiroVortex System which is a complete treatment process akin to activated sludge, the Degritting Clarifier and Clarigester and the DorrClone Classifier as applied to sewage degritting have already been commercially proven at plants in the western U. S. First installations of the CompleTreator, a package plant to serve a population of 150, are now operating with some 30 additional units scheduled to start up in 1958.

Our subsidiary in the Netherlands has marketed equipment for facilities as far distant as Norway, Iraq and India, while new or enlarged D-O equipped domestic installations sold in 1957 can be found from New York City to Los Angeles and San Antonio, Texas to Fairmont, Minnesota.

GENERAL METALLURGICAL — Applications of the DSM Screen, first introduced in 1956, continued to grow in virtually every field we serve. One of the most promising has been magnetite recovery in heavy media cyclone plants on the Mesabi Range. Also new is the swing-type agitator for the American Filter — a development particularly applicable to filtration of heavy metallurgical slurries.

Following the trend noted in previous years, widespread acceptance of the Slurry Mixer by the cement industry and the Thickener — American Filter combination by the coal industry continued again last year. In Germany, France, India and Australia flue dust clarification and recovery contributed materially to our business and in Canada a substantial volume of Dorr-Oliver-Long shaft equipment and mine cars was purchased for underground mines.

PLANT ENGINEERING — At the year's end, design of a granular fertilizer plant for India and sections of a new Cuban nickel recovery plant were partially completed, and construction of three D-O designed phosphoric acid or fertilizer plants was progressing in Venezuela, England and Montana. During the year a 200,000 ton per year triple superphosphate plant in Florida and a Norwegian phosphoric acid installation were put into operation and brought up to design capacity in near record time.

FLUOSOLIDS SYSTEMS — Also in the fertilizer industry two western producers ordered the first FluoSolids Systems to be used for calcination of phosphate rock. Designed to handle a total of 1,500 tons per day, these installations were the direct result of successful field tests using a portable fluidized bed pilot plant. During the year other FluoSolids Systems were ordered to dry limestone and blast furnace slag in the U. S., roast copper matte in Belgium, calcine clay in Scotland, decompose copperas in England, and roast pyrite for a Japanese paper mill and an Italian sulfuric acid manufacturer.

The largest FluoSolids System for fine coal drying, handling over 600 tons per hour, went into operation during the third quarter at a new eastern preparation plant, and construction is nearing completion on a second similar but smaller, installation. In the realm of unusual applications is a unit drying a highly-corrosive chlorinated hydrate at an eastern chemical plant.

PETROLEUM — Another modification of the familiar DorrClone Classifier is the ClayJector, latest development for control of drill mud weights. Noteworthy economies are possible using this unit which mechanically rejects undesirable drilled solids while recovering valuable barites for reuse.

PULP AND PAPER — Another operating "first" recorded during the past year was initial operation of the first complete D-O Pulp Bleaching System. Located at a northern New York state mill, it is the result of an extensive program to develop a new and improved continuous bleaching system for the pulp industry. Abroad, the Swedish representative of our Dutch subsidiary has just completed an outstanding year marked by one of the largest orders in their history for Bleach Washers and by orders for a number of new or expanded Recausticizing Systems.

WATER TREATMENT — In the southwestern United States the DorrClone Classifier has been used with notable success for the desanding of municipal well water supplies. For small plants the PeriFilter System with a single pre-treatment unit and split filter provides economical unitized water treatment.

Major expansions of the Louisville, Kentucky and Fort Worth, Texas treatment facilities will be D-O equipped as will new municipal plants at Springfield, Ohio; Peoria, Illinois; and Delhi, India. New industrial treatment installations will serve pulp mills in South Carolina, India and Venezuela and an Indian fertilizer plant.

CHEMICAL — A substantial amount of D-O equipment of all types has been incorporated into the unique flowsheet of a new astrakanite recovery plant in the Chilean nitrate fields. In Germany and the United States, Horizontal Filters have been widely applied to dewatering and washing of fine organics as well as highly corrosive inorganics, and around the world filters of both standard and special construction were ordered for an almost endless variety of services.

FOOD PRODUCTS—A mid-western producer has ordered twelve centrifugals of three basic types for washing and concentrating soya protein solids. Last year the largest U. S. corn starch producer put into operation a Merco-DorrClone starch washing system, and in 1958 the first DorrClone germ separation station in the same industry will go on stream. Also in centrifugals, a smaller model of the Mercone Screening Centrifuge is now available for intermediate or small scale operations.

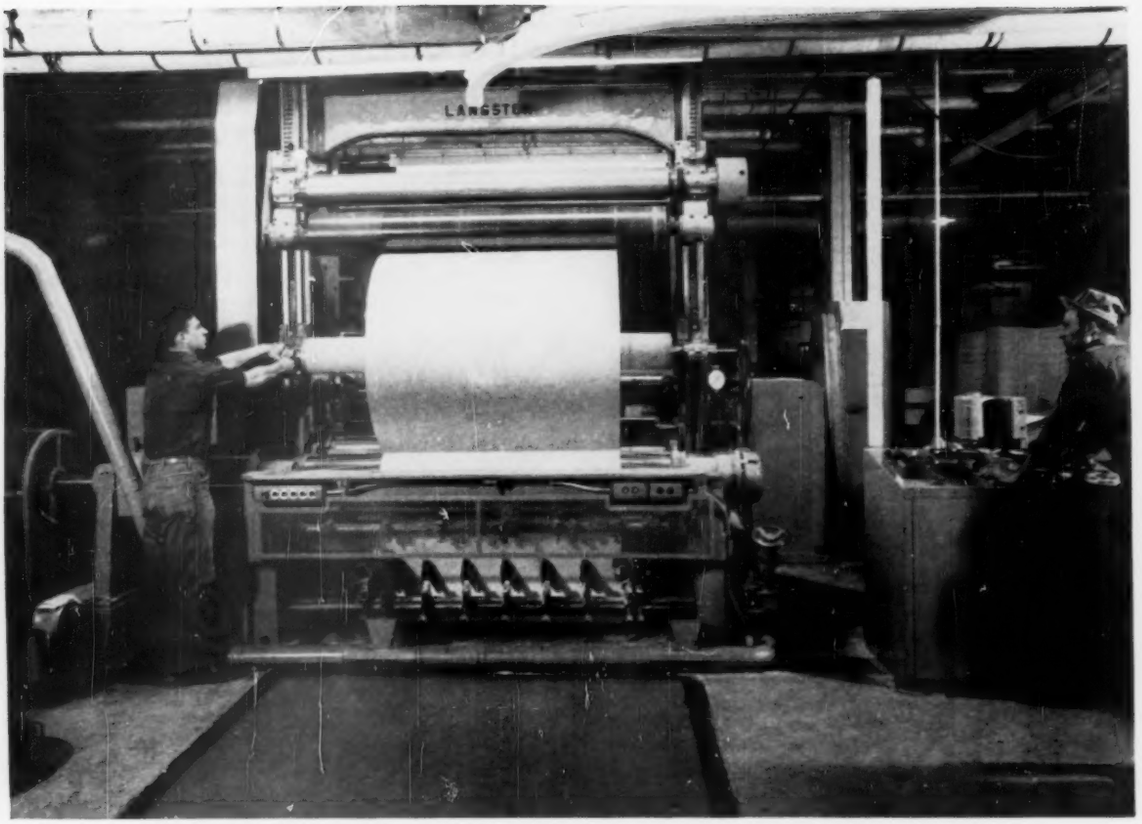
COPPER AND URANIUM — Last year substantial amounts of D-O processing equipment were purchased for new and enlarged copper mills in South America, Mexico, the Belgian Congo and United States and new uranium mills in Australia, United States and Canada. A new and improved design and method of fabrication of stainless steel rake Classifier blades was developed. Although conceived initially for the uranium industry this design is broadly applicable to classifications involving corrosive solutions. Certainly no summary of 1957 accomplishments would be complete without mention of the Chemical Engineering Achievement Award presented last month to a group of companies including Dorr-Oliver for their contribution to extractive metallurgy of atomic age metals. Interestingly enough, D-O was one of the very few engineering equipment organizations selected for the award.

With several years of expansion and enormous activity behind us, the current business plateau provides a much needed opportunity to consolidate and catch our breath. The real challenge will be to increase the spread between income and outgo through more efficient operation — while accelerating the rate of our technological advances. I am confident we can, and will, do both.

J. D. Hitch, Jr.
President

November 18, 1957

FluoSolids, DorrClone, PeriFilter and RapiDorr T. M. Reg. U. S. Pat. Off.



New 72-inch Type CA Langston Slitter and Winder in Marathon Corporation finishing room handles rolls up to 60 in. in diameter at speeds up to 1500 ft. per minute. Finished rolls are lowered by hydraulic drop shown in foreground.

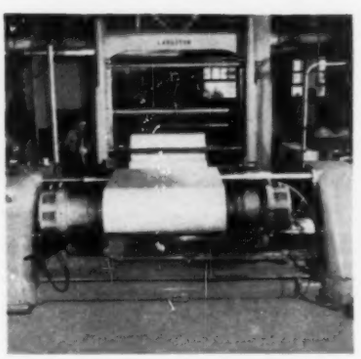
New Langston Slitter and Winder helps Marathon cut operating costs

This new Langston Slitter and Winder installation at Marathon Corporation's Rothschild, Wis., mill is already helping the company cut costs and speed processing of quality paper and board.

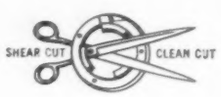
For example, the power-operated shaftless unwind stand with constant tensioning virtually loads itself. No crew is needed to bull heavy shafts into place. And the Langston hydraulic roll ejector permits 1-man removal of finished rolls. These two features alone are saving Marathon several thousand dollars a year.

Besides effecting major operating economies, these Langston machines also pay off in higher quality rolls. The hydraulic rider roll control, for instance, automatically keeps nip pressure constant, regardless of the diameter or weight of the rewound roll. This insures rolls of uniform density, free from wrinkling or tendencies to telescope. The shear-cut slitters cut like scissors instead of a knife, shearing cleanly and keeping paper dust to a minimum. The resulting clean-edged, dustfree rolls are easier for customers to process.

Learn how you can benefit from the advantages of Langston Slitters & Winders. Write SAMUEL M. LANGSTON CO., 6th & Jefferson Sts., Camden 4, N.J.



Langston Shaftless Unwind Stand eliminates the time-consuming, back-breaking task of hoisting heavy shafts into place. The hydraulically actuated arms reach out, pick up the roll and lift it to running position—a 1-man, push-button operation.



LANGSTON Leadership...by design

Beginning of Easier Cutting

THE NEW, ALL NEW

HOMELITE

6 22

You can cut more wood in less time with the new Homelite 6-22 chain saw in any kind of hard or softwood production cutting.

From notching to final bucking, its 6 full horsepower and 22 balanced pounds make quick work of every cut. It has the lugging power to fell trees up to 7 feet in diameter and cut through 20″ trees in 18 seconds. Big new fuel tank lets you cut longer without refueling. A real professional's saw, the Homelite 6-22 stands up under the grind day in and day out for dependable, low-cost operation.

Famous Homelite engine features give you more for your money, too . . . new, revolutionary intake valve increases engine power, prolongs life. New chrome-plated cylinder in the short-stroke, high-compression engine cuts friction, decreases gas consumption.

Your choice of straight blades from 14″ to 60″ or 14″ and 18″ plunge-cut bow. Get a free demonstration from your Homelite dealer.

HOMELITE
A DIVISION OF TEXTRON INC.
7701 RIVERDALE AVE., PORT CHESTER, NEW YORK

Homelite builds and sells more chain saws than any other company in the world.

See all the famous Homelite Line!

6-22 most versatile all-purpose gear drive chain saw available. Has straight blades, plunge-cut bow, brush-cutting and clearing attachments. 6 horsepower, 22 pounds. Gives you everything you want for dependable, year-round performance.

EZ-6 lightest, most powerful direct drive chain saw made. 6 horsepower, 19 pounds. Easy to carry, easy to handle. Cuts trees up to 5 feet in diameter, zips through 8″ oak in 4 seconds, 18″ pine in 14 seconds.

4-20 rugged, gear-drive chain saw gives you consistent, dependable performance in a wide range of cutting jobs. 4 horsepower, 20 pounds, cuts trees up to 4 feet in diameter.

7-29 most powerful one-man chain saw you can own. 7 horsepower, 29 pounds. Powerful enough to bring down any tree in a stand. Fells trees up to 10 feet in diameter.

BEN BUTLER (right), West Coast Production Manager, Borden Company Chemical Division. Left, Bernard Egan, Alaskan Copper & Brass Co., Cooper Alloy distributor for the Pacific Northwest.

BUTLER OF BORDEN CHEMICAL

tells why he buys COOPER ALLOY stainless steel valves

Q. Mr. Butler, why does Borden Company Chemical Division require stainless steel valves?

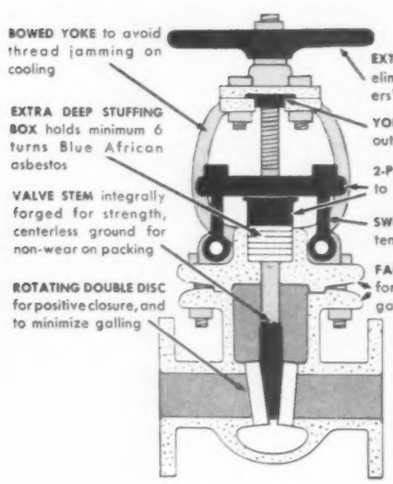
A. In the manufacture of formaldehyde, its derivative resins, and corresponding industrial adhesives only stainless steel can meet our rigid requirements for corrosion, contamination and heat resistance.

Q. What do you consider the most important factor in purchasing valves?

A. The truest measure of a valve is its operating performance. We have never received a complaint on Cooper Alloy valves from our engineers or operating personnel. The extra-large handwheel and unique valve design afford easy operation with positive opening and closing, minimizing maintenance and down time.

Q. What other factors count in choice of valve supplier?

A. Service. The large and complete Cooper Alloy stock at Alaskan Copper affords immediate delivery on stainless steel valves and fittings, as well as pipe. That's a big reason why we buy Cooper Alloy!


BOWED YOKE to avoid thread jamming on cooling
EXTRA DEEP STUFFING BOX holds minimum 6 turns Blue African asbestos
VALVE STEM integrally forged for strength, centerless ground for non-wear on packing
ROTATING DOUBLE DISC for positive closure, and to minimize galling
EXTRA LARGE HANDWHEEL to eliminate need for "persuaders"
YOKE NUT REPLACEABLE without valve disassembly
2-PC. GLAND CONSTRUCTION to prevent scoring of stem
SWINGING EYEBOLTS for maintenance convenience
FAIRED BODY-BONNET FLANGES for equal stress and uniform gasket loading

A VALVE DESIGNED FOR STAINLESS!

The Cooper Alloy valve is not an adaptation of earlier brass and iron patterns. Cooper Alloy, with over 35 years of experience in handling stainless steel, created a valve *designed to be cast in stainless!* **Check the Special Design Features shown at left.**

As the little CA man below is saying: "*You can tell a Cooper Alloy Valve as far as you can see it!*" Write today for *your* copy of our folder "Design Factors In Stainless Steel Valves." The Cooper Alloy distributor near you will be glad to show you the complete line of Cooper Alloy valves *and fittings*, and their advantages. He can serve you promptly from local stocks.

COOPER ALLOY

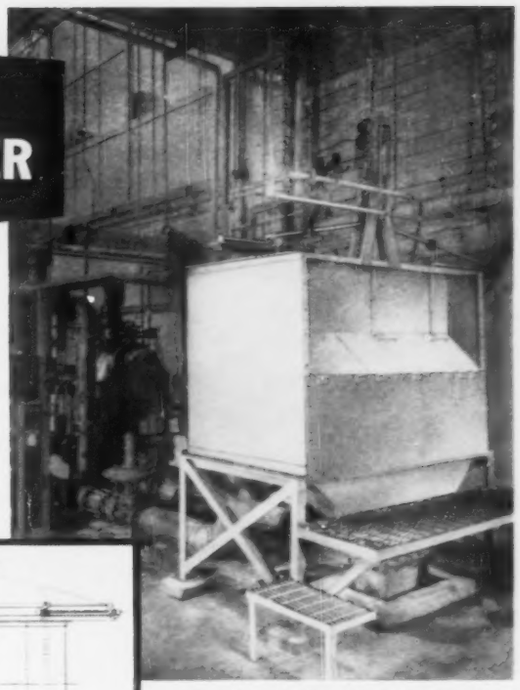
Corporation • Hillside, New Jersey

VALVE & FITTING DIVISION

THIRTY-FIVE YEARS OF STAINLESS STEEL PIONEERING

SPROUT-WALDRON/COWAN

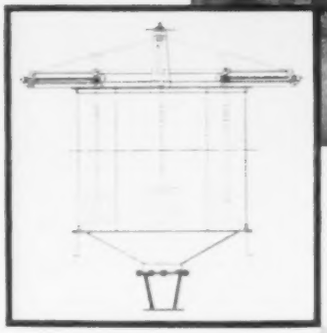
STOCK PROPORTIONER



One of 3 Stock Proportioners at Bowaters Southern Paper Corp., Calhoun, Tenn. The sketch at the left shows the orifices and the control mechanism.

NOW MADE BY SPROUT-WALDRON

- **Meters and proportions stock flows to the paper machine chest.**
- **Meters and proportions pulp and white water ahead of screens.**
- **Provides uniform, accurate volumetric metering of pulps.**

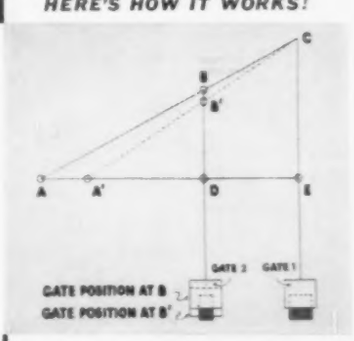


The Sprout-Waldron/Cowan Stock Proportioner is a controlled set of highly accurate, adjustable submerged orifices – the most consistently accurate type of stock flow control. The flow is directly proportional to orifice area over a wide range of flow. One orifice serves for each stock proportioned. Linking the orifice gates is a ratio setting mechanism notable for simplicity, accuracy, and trouble-free operation. There is no troublesome pneumatic, hydraulic, or electrical equipment.

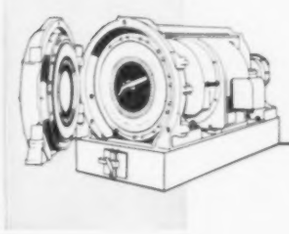
As many pulps as desired can be proportioned. For example, in a newsprint mill, broke and sulphite are proportioned to the groundwood flow. Total flow is regulated by a hydraulic cylinder controlled by the machine chest level. It's a simple matter to proportion even 5 or 6 different pulps.

Available in 2 basic models – the overflow type and the controlled level type. For full details, write to *Sprout, Waldron & Co., Inc., 32 Logan St., Muncy, Pa.*

HERE'S HOW IT WORKS!



Consider two adjustable orifice gates designed to move vertically and which are operated by rod AC pivoted at A. The ratio of movement of Gate 2 to Gate 1 is a constant and is proportional to the distances AD and AE. A change in the position of Gate 1 moves Gate 2 proportionally. The ratio between the orifice areas is changed by moving pivot point A.



SW

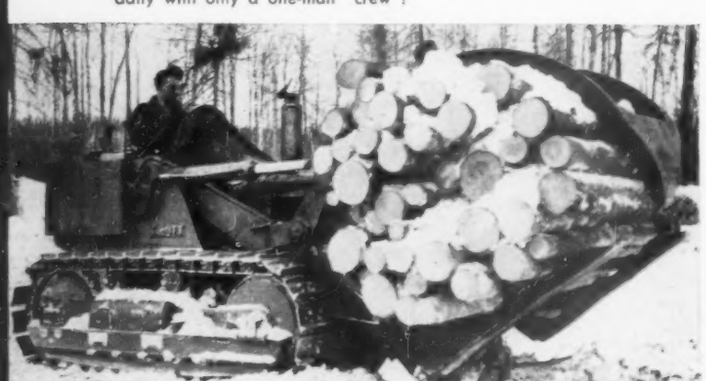
SPROUT-WALDRON

MODERN PULP PRODUCTION EQUIPMENT

PP-519

Exclusive winter-beating break-out ...Exclusive grab-arm load control!

The International TD-9 pulpwood Skid-Grapple loads up to one cord of 8-foot pulpwood per pass—240 cords, or more, daily with only a one-man "crew"!



Using semi-skid transport on big, heavy-duty Skid-Shoes lets you transport full grapple-loads with exceptional ease and speed. Impact forces of rough-ground travel are gentled 67%, or more, by exclusive, shock-swallowing Hydro-Spring!

You pile high into trucks or onto piles—use selective dumping control, to release logs one by one, or all at once. Top grab-arm is controlled by third valve of hydraulic system—which can also be used to control rear-mounted road-working equipment.

Get into an International crawler's rubber-padded seat, press the starter button, and you're on your way to greater pulpwood profits! Turn on the power and *simply push* the lower arms of the International Drott Skid-Grapple into the woodpile. As soon as a grapple-load is in grabbing position, use fingertip control to clamp onto the wood securely with the *exclusive* top grab-arm.

Then apply *exclusive* triple-power pry-over-shoe break-out action—and you wrench loose even frozen-down or mudded-in pulpwood, without any peavey-prying or other handwork, whatsoever!

Use famous International Drott-developed ground level roll-back to bring the load close to the tractor, improve balance, provide "see-all" visibility, make transport easier.

With an International Drott Skid-Grapple you have the *traction* and *break-out action* to load big cordage anywhere, in any weather. *And from the time cutters stack your pulpwood on strip-road or at the stump, you don't touch it by hand!*

Prove you can save $1.00 or more in labor costs per cord with a Skid-Grapple and get production-line efficiency. See how you get a multiple-duty road-builder—by switching a Skid-Grapple with a Four-In-One, or Skid-Shovel bucket or Bull-angledozer blade. *Compare* exclusive shock-swallowing Hydro-Spring advantages. See your International Drott distributor for a Skid-Grapple demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

Forecasts for Next 50 Years:

- "Utmost confidence" in future needs for wood
- By 1970 second growth will greatly offset old growth loss
- Will be cutting old growth in 21st century
- Foresters will be managers of water and recreation
- Chemicals will be used to stimulate tree growth
- Disease and insect problems will be subdued

Problems Must be Faced:

- Excessive diversion of forest lands to highways, military use
- U.S. timber sales policies which force private mergers

F. K. Weyerhaeuser

Weyerhaeuser: "We may grow Two Forest Crops In time it now takes for one"

By FRED K. WEYERHAEUSER
President, Weyerhaeuser Timber Co.*

● To consider the future and what it holds for the forest community:

The greatest fact of the modern world is the population explosion that has doubled the world's population in the past 75 years and the population of our country in the past 50 years. Industrially advanced countries have been able, at the same time, to double and redouble the living standards of this growing population. Who knows where this will lead?

Assuming that our U.S. population and that of the world continue their rapid increase, it is generally accepted that markets for the various forest products will also expand in varying degrees, depending on how well they compete with other products. Our efforts will be increasingly directed at growing more and better wood. I have the utmost confidence in the future need for our forests as raw material for industry.

Think Twice About Diverting Land Use . . .

A factor entering into this matter is the diversion of enormous acreage of fertile farm and forest land for airfields, highways, power line rights-of-way, reservoirs, and military reservations. Continual reduction in the acreage available for growing trees will further necessitate intense use of all remaining forest lands. The time may come when we will think twice before we divert good forest land to these uses, important as they seem.

Recreation Use Will Increase . . .

Another forest use that will increase with the years is for public recreation. As our population increases, rural areas are becoming suburbs of cities and people are more in need of the solitude that mankind finds best in the woods. The public is learning better how to conduct itself in the forest.

Weyerhaeuser Timber Co. and an increasing number of other private land owners open their lands to hunters and other recreationists (unless the fire hazard is severe) and ask them only to observe a few rules for their own safety and protection of the forest. It has been heart warming to see the appreciation and cooperation of the public.

Foresters Will Manage Water . . .

Expanding populations are also placing increased pressure on forests for their watershed value. On both publicly- and privately-managed forests, it has been conclusively and consistently shown, that, just as timber and game can be twin crops, so too can trees and water be harvested from the same land. The forester of tomorrow will be called on to manage and protect an increasingly valuable resource, water.

Problems from Government Policy

Another problem is how to utilize efficiently the vast timber resource in government ownership. Government policy is to retain ownership of forest lands it now owns and to manage them on a sustained yield basis, selling the timber crop from time to time to the highest bidder. No single industry or company can be sure of its ability to compete successfully for government timber in the future.

Still, the American philosophy of opportunity for the little fellow and the obligations of government to get fair value for government property cannot be brushed aside. Competition will in the future force further integration either within given companies or between producers of lumber and plywood and producers of pulp and fiber products.

(please turn page)

* From address at 50th Anniversary Celebration of University of Washington College of Forestry, Seattle.

Two Prophecies . . .

The management of nearly all old-growth forests is already on a sustained production basis. This, coupled with the trend toward increased integrated utilization, means that there will be old-growth timber in the Pacific Northwest still being cut well into the 21st century. We're a long way from running out.

Most of us are accustomed to hearing about the depletion of old-growth timber. We have heard much less about the new crop of trees that is growing up all around us. The young forests, coupled with the full sustained-yield crop of the government-owned forests, will be able to support a rising volume of forest products. From now until the early 1970's, the recent trends of slowly-declining lumber production, a stable volume of plywood and a growing output of pulp, will probably continue.

Beginning about 1970, the rise in Washington state lumber production from second-growth sawtimber is likely to be spectacular, much more than offsetting the decline in use of old-growth.

What About Markets?

All the long-range economic trends point to booming residential and commercial building in the decades just ahead, so that expanded lumber production should find a ready market. Meanwhile, the steady growth of pulp and paper production will continue to provide an expanding market for mill residuals, thinnings from second-growth stands, cordwood and lower grade logs.

Protecting and Improving Tree Growth

Foresters with new techniques and chemical aids are engaged in an all-out battle with insects and disease. It takes no prophet to foretell vast technological advances over known enemies in this field in the next 50 years. I am confident our forestry researchers will successfully overcome them.

In agricultural fields, scientists have developed disease-resistant strains of wheat, hybrid corn and other crops. The implication is clear that work in the growing of tame trees may produce trees that yield significantly more and better wood per acre per year and that resist onslaughts of insects and disease better than the wild ones grown without man's assistance.

Need for Foresters . . .

Protection and propagation of America's forests unquestionably rests in the hands of trained foresters. The growing and harvesting of the forest crop, its conversion to useful products and its sales, have become jobs for educated men armed with the knowledge which only modern science can supply.

The value of our forests is enormous. Our national safety depends on them. Their crop annually forms the basis for several of our major industries and the livelihood for millions of Americans.

He said Weyerhaeuser Timber Co. employs 150 graduate foresters in the woods and 49 graduate foresters in sales.

Schmitz . . . Weyerhaeuser . . . Colwell . . . Marckworth

Celebrate 50th Anniversary of Washington's College of Forestry . . .

Well-known members of forestry profession and forestry industry gathered in Seattle to commemorate 50th anniversary of College of Forestry, U. of Washington. Here are (left to right) HENRY SCHMITZ, president of U. of Washington., F. K. WEYERHAEUSER, president, Weyerhaeuser Timber Co., Tacoma, DON COLWELL, logging manager, Boise-Cascade Corp., Yakima, which is building a pulp and paper mill at Walla Walla, and dean GORDON MARCKWORTH of the college. Dr. Schmitz and Mr. Weyerhaeuser renewed a friendship begun in St. Paul, where the former headed forestry education at Minnesota U. and the latter headed Weyerhaeuser sales company.

Helicopter Reseeding Success in West

Helicopters were used recently by two British Columbia companies to re-seed over 2,000 acres of forest land that have been logged off in recent years and failed to produce new timber naturally.

Crown Zellerbach Canada covered an area on the northeast slope of Mount DeCosmos between the 800 and 1,500 ft. levels. The seeded land was logged and slash-burned over a period of nine years, but fire in 1952 reburned part of the area, destroying most of the naturally established young forest.

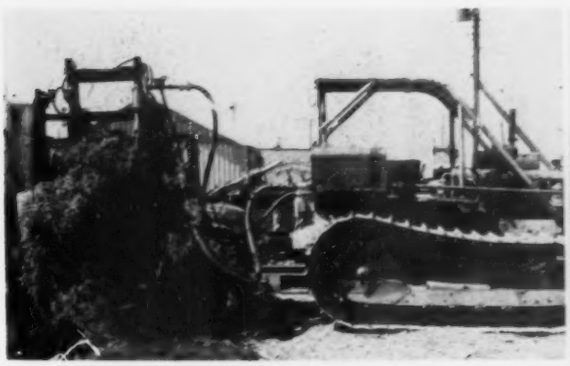
With a forester beside the pilot as a guide, the helicopter flew at 50 mph about 150 ft. above ground in parallel strips. Men waving bright orange flags marked the ends of each strip, each moving 100 ft. to the side to mark the next run. The whole section was crossflown, using ¼ lb. of seed per acre in each direction, to insure a more uniform distribution of seed.

Aerial seeding was chosen over hand-planting and hand seeding because on this operation it could be accomplished at less cost in a few hours instead of several months; suitable planting stock might not be available for several years, and the habitat was ideally suited for germination.

MacMillan & Bloedel's forest division—also used a helicopter to seed about 1100 acres of logged-off forest land. Aerial seeding, as long ago as 1951, has become a part of the company's reforestation. Areas at high levels do not regenerate readily by natural means, largely because of seed scarcity, but company foresters have found that areas can be satisfactorily seeded at the rate of 150 acres an hour. Examination of other 1,100 acres aerially seeded in 1956 indicates 2,500 young trees have taken root on each acre.

The helicopter, owned by Okanagan Helicopters, Ltd., of Vaucouver, was fitted with a hopper on each side and metering device which distributes seed at the rate of ¾ lb. per acre on two runs made at right angles.

In 13 hours 2,500 acres of International Paper Co.'s Ryderwood Tree Farm in southwestern Washington were recently seeded from a helicopter, according to M. C. Bonney, resident forester of the Long-Bell division. Some 50 million Douglas fir seeds, treated with rodent repellent and weighing 1,250 lbs., were sown at a rate of a half-pound per acre.



Called a "Spruce Harvester" . . .

Left–Shows machine at right angles to a tractor, its power source.

Right–Closeup, showing infeed side. The outfeed side (behind this) has slasher and jackladder for piling.

A New Multiple Action Machine for Woods . . .

. . . it is a Skidder, Delimber, Debarker and Slasher–all in One

This new 4-in-1 machine was developed by Bob Larson, president of Hiabob Hydraulics, Ely, Minn., whose Hiabob hydraulic pulpwood loaders have been catching on. Over 300 of the loaders are now in use.

The Spruce Harvester has an "A" frame and two-drum winch for skidding full trees to the spiked infeed rollers. Debarking and delimbing are accomplished with four chain flails hydraulically driven, two vertical and two horizontal. As each 100 in. section of the tree passes through the debarker-delimber, it is automatically measured off by being stopped at a bulkhead. The infeed rollers are stopped momentarily and a circular slasher saw bucks to pulpwood lengths. The pulpwood bolt drops into a jackladder which will stack approximately one cord at each machine location.

The Spruce Harvester will be mounted on a steel dray and moved into position behind a crawler tractor in the 45 hp. class which provides power to a large capacity hydraulic pump. Hydraulic hoses are connected from the tractor to the dray. Spruce will be felled directionally by cutters with power saws. However, from this point on all similarity to a conventional operation ceases. The machine will skid, delimb, debark, slash and pile the pulpwood bolts on the roadside.

As a 4-in-1 machine, the Spruce Harvester will have an application limited to the black spruce region of northern Minnesota, northern New England and large areas in Canada. As a 3-in-1 machine, a skidder, debarker and slasher, the Harvester will have application in all areas where pulpwood is produced. It will be available in both models.

Delimbed and Debarked

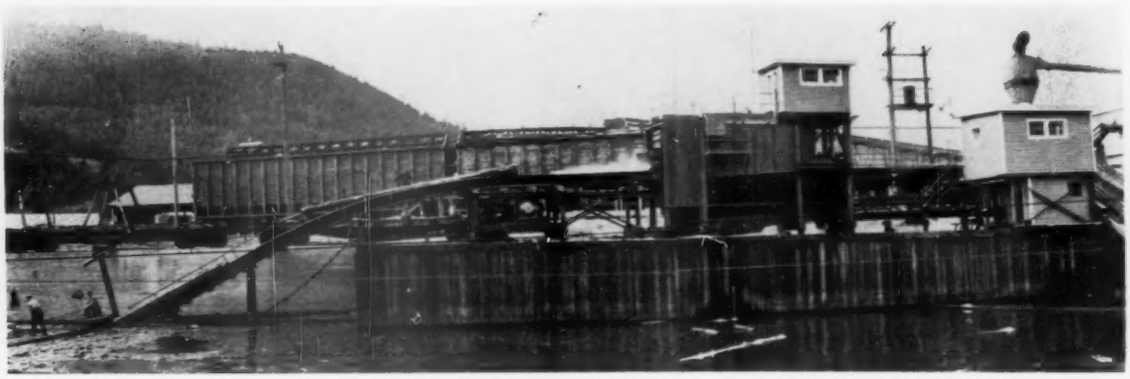
While it is still in the experimental stage, leaders in the pulpwood production industry are eagerly awaiting this type of machine. It is presently being tested in Minnesota logging. "We expect the machine to produce approximately five cords an hour," Mr. Larson told PULP & PAPER. "To date we have not been running consistently at any particular rate. Our best production runs have given us a timing of approximately 50 sec. per tree through the machine."

Last month it was announced that Henry M. Shepard, former Lake States forest engineer for the American Pulpwood Assn., and former assistant woodlands mgr. for St. Croix Paper Co., has joined Hiabob Hydraulics, Inc. He now has moved his family to Ely.

Films on McCulloch Saws

A new slide film, "Principles of Ignition," is now available for showings by McCulloch's field service staff to interested groups on the maintenance and service of McCulloch saws. Other films in the series are "Principles of the Two-cycle Engine" and "Principles of Carburetion."

Address requests to Jack Carroll, Technical Training & Publications Supervisor, McCulloch Motors Corp., 6101 West Century Blvd., Los Angeles 45, Calif.



Barker Installation of Anaconda Co. at Bonner, Mont. . . .

Logs move from pond at lower left up jackladder and onto Esco feed chains ahead of barker structure. Barker operator and all controls are housed in structure at extreme right.

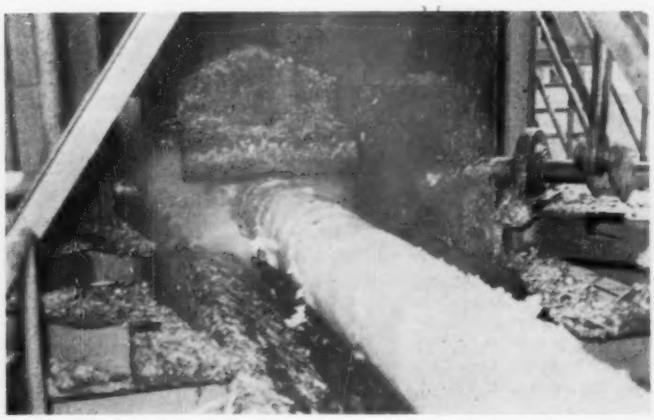
Here's How Mining Company is Making Chips for Montana's First Pulp Mill

Bonner, Mont. • Anaconda Co.—world famed for mining—operates a lumber department, at Bonner near Missoula, Mont. This was the first sawmill organization to start up a barker and chipper to manufacture raw material for Montana's first pulp mill.

The new noodle pulp mill, built by Waldorf Paper Products, is 20 miles from Bonner at a point called Frenchtown, 14 miles west of Missoula. The pulp is being baled and shipped by rail to the Waldorf paper mill in St. Paul, Minn.

The pulp mill was started up this last fall. All raw material presently consumed is obtained from sawmill leftovers. But there is also a vast stand of lodgepole pine in western Montana that could be utilized as raw material for pulp, providing logging costs could be held to a minimum. This lodge pole material does not generally attract buyers who need sawlogs; but, in large-volume pulpwood operations based on clear-cutting, the proposition is much more feasible economically.

Barking and chipping is a logical step forward for such producers as Anaconda Co. Full and complete utilization has not been possible before because of the tremendous distances chips would have to be shipped. In periods of a slow demand in the lumber field, the production and marketing of pulp chips will be a very important activity.

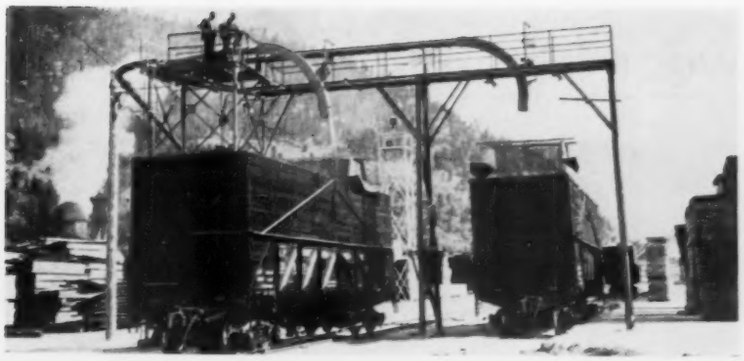


Barked Log . . .

emerges from Hansel barker. This is approximately the view that operator sees from his spot in the control room. He sees if manual operation is needed.

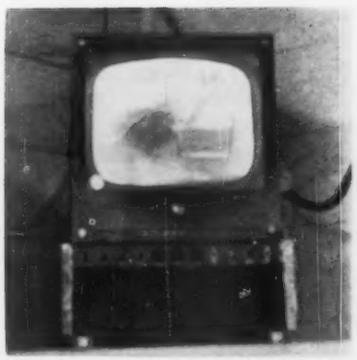
Operator Controls Destination of Logs . . .

either to pond or stull mill. Log kickers can be set on automatic. This console has controls for water system, bark disposal, log lift and transfer deck.



Chips are Blown into Cars . . .

at the rate of one per 4 min. Car mover in foreground takes care of travel automatically. Trip to pulp mill is approximately 20 miles from Anaconda sawmill.



Television Closed Circuit . . .

aids Anaconda workers in chipper area by showing them how carloading is progressing.

The Bonner plant, which consists of a large sawmill and adjoining stull mill (making mine timbers), is able to produce 100 units of pulp chips from bark-free leftovers per shift. Normally, the Bonner facilities are operated two shifts, with a total chip capacity of 210 units per day.

Following on the heels of the Bonner installation, Intermountain Lumber Co. completed new barking and chipping facilities at its large Missoula plant. Various other Montana sawmills, such as at Hamilton, Superior and Libby, are making similar installations. Montana has an estimated 2000 tons of chippable mill residues available at railheads each day.

Equipment at Bonner . . .

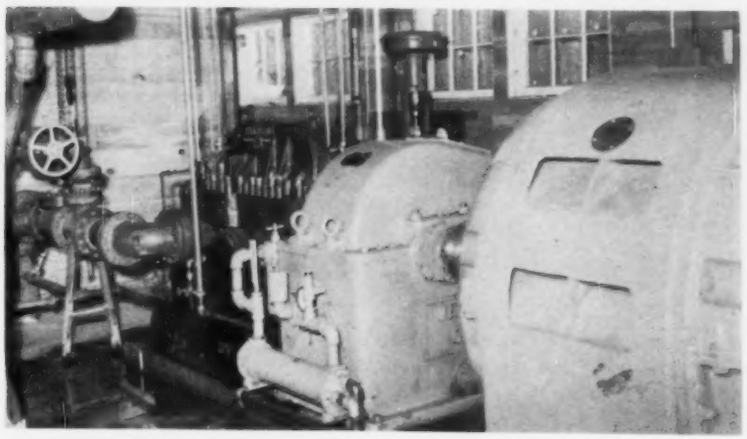
At Bonner, a hydraulic barker built by Hansel Engineering, is used. It is considered 90% automatic from log pond to final transfer. Speed ranges from 60 to 100 fpm. However, an operator is on duty at all times to take care of odd-sized logs, log selection and clean-up, maintenance and minor repair. Hansel also built Bonner's chipper.

Industrial TV is employed in the chip distribution and car loading system. The movement of cars and chips is controlled remotely from the chipper room. A closed-circuit TV shows the man in the plant how the cars are being loaded. A picture of the carloading operation is screened on a TV receiver set mounted in the chipper area of the sawmill. Movement of cars and loading devices is controlled remotely by men in the chipper area.

The barker pump-power set includes a General Electric TriClad synchronous motor, 2300 volts, 1000 hp at 1200 rpm; Western Gear Corp. Model 160HS 80 high speed unit transmission with gear ratio of 3.23: (original rpm 1200, delivered rpm 3880); and a Bingham pump with Fischer Governor speed control.

The log haul drive unit is Western Gear powered by General Electric motor and chain is by Esco. A barker water strainer is a Glenfield Micro-Strainer equipped with General Electric motor and Crofts (English) drive and Westinghouse electric motor and Ingersoll-Rand pump.

Intermountain Lumber Co. of Missoula is also one of the major suppliers of chips to the Waldorf pulp mill. A Nicholson mechanical barker has been installed at the Intermountain plant. Chipping is accomplished in a Norman chipper with 66 in. helical face. Intermountain has a long-term contract with Waldorf.



Water for Barker is Pumped by this Set of Units . . .

Power plant (right) is General Electric 1,000 hp motor, coupled to Western Gear high speed drive and Bingham high pressure pump.

Forest Insect Lab Opens

Timber growth prospects in the Western states are brightened by completion of a new $35,000 forest insect laboratory at Oregon State College, one of the best labs of its kind in the nation. In the Northwest, insects have become the foremost hazard to timber management. A major part of the work will be testing insecticides.

Dr. Julius Rudinsky, project leader, says the lab will "raise its own" insects. At least two and probably three generations of some insects can be raised annually as compared to a single generation available under field conditions.

Plants 160,000 Trees

Crown Zellerbach plans planting 160,000 trees this fall and winter on 296 acres of its Clackamas Tree Farm according to Chief Forester George H. Schroeder. Since 1944 over 12 million seedlings have been hand planted on 33,500 acres and another 15,321 acres restored to timber crops by aerial seeding on CZ's Oregon and Washington timberlands. Most planting stock is grown from specially selected seed.

First Steps in Speed-Up of Production by 14-Man Crew in Maine . . .

At left, operator of Caterpillar D4 tractor prepares to send a log down short skid to pre-bunch location.

At right, a D6 Caterpillar with Hyster sulky moves bunched logs to slasher-pallet loading area. Operations there are big factor in . . .

Boosting Pulpwood Production 100% . . .

. . . above national average. Well-trained S. D. Warren Co. crew accomplishes this with a mechanized sulky-slasher-pallet system

● In a show near Bridgton, Me., one of S. D. Warren Co.'s 14-man crews is producing an average of 30 cords of pulpwood per day. This 2.1 cords per man per day compares with an estimated average across the country of one cord per man per day.

Here's how it's done:

Three "choppers" with chain saws selective cut in a chosen area not over a mile from the slasher emplacement in the low, rolling hills of southwest Maine. A Caterpiller D4 tractor with angle dozer roughs out the skid trails to the slasher and then goes to work skidding the logs out to the trails and prebunching. A Cat D6 with rubber-tire Hyster Model LSN sulky moves along the skid trails and picks up the tree-length (8 to 24-in. dbh) maple, birch and some softwood logs for movement to the slasher unit. Chain chokers are left on the logs at the pre-bunch point by the D4 operator. It remains only for the D6 operator to pick up his load of 3½ cords and move to the slasher along the skid trail.

The logs are dropped on a slight slope alongside the slasher and the D6 returns to the woods. Two men use peavies to feed the converted drag saw-slasher with one man operating the slasher to cut 48-in. pulpwood bolts.

The slasher emplacement is on four levels. The highest point is the slope where the logs are dropped, and tree-lengths moved into the saw-slasher. The next level down is the loading platform to the pallets. The third level is a pallet track system, one set of tracks for sliding empty pallets on and the other for loading and sliding full pallets onto haul trucks. Two men, one on the loading platform and the other on the pallet track level, or both on the loading platform, heave the 48-in. pulpwood bolts onto the pallets. The fourth level is the haul truck level, four feet below the pallet track system.

A Dodge 6x6 Army-type personnel

Slasher Emplacement is Heart of Operation . . .

In foreground a feeder stands with his peavy, ready to assist in moving log into saw. Two loaders are ready to toss next pulpwood bolt onto pallet behind them.

carrier with winch moves loaded pallets down the track to make room for an empty.

Haul to Mill . . .

Two tandem axle trucks with integral winches make the 57-mile haul to Warren's Cumberland mills. Each truck makes three trips per day with four pallet loads. The firm has sixteen 1¾-cord pallets moving in this manner. A haul truck comes to the slasher emplacement, skids its four empty pallets from the mill onto the pallet track system, moves only four feet and winches on four loaded pallets for the return trip to the mill—an operation taking no longer than 15 minutes.

The company moves 30 cords of hardwood and some softwood pulpwood to the mill each day. The mobility of the operation also guarantees almost uninterrupted production. The slasher can be relocated in one day, providing basic emplacement site preparation (establishment of the four levels) has done previously. A Cat D6 tractor with dozer roughs out the slasher emplacement in half a day.

In charge of the woods operation near Bridgton is Harry Melcher, son of Warren's woodlands manager, E. C. Melcher. Harry has responsibility for keeping his well-trained crew at peak production, equipment in shape, and locating and arranging new slasher emplacements.

Tree-length logging with a mechanized sulky-slasher-pallet system began ten years ago. Objective of the new (in 1947) idea was to provide a year-round logging show and maintain highly trained crews for increased production at low cost.

Wing Conditions . . .

Keeping highly specialized woods personnel in their jobs could present a family relations problem, since men have to move to the timber stands as they are opened, so, the company provides portable homes for the crews' families. Company pre-planning of harvesting operations necessitates movement of families and their portable homes about once every five years.

Pleasant semi-permanent home site areas of S. D. Warren's crews contrast to the cumbersome, and not always satisfactory, logging camp system which necessitates more personnel, accelerated cutting rates, and freqent costly movement of camps.

With family members remaining together year-round in a home situation, Warren's woods crew members are more content and tend to remain in their specialized tasks in the tree-length operation with the mechanized sulky-slasher-pallet system.

How to Unload a Barge . . .

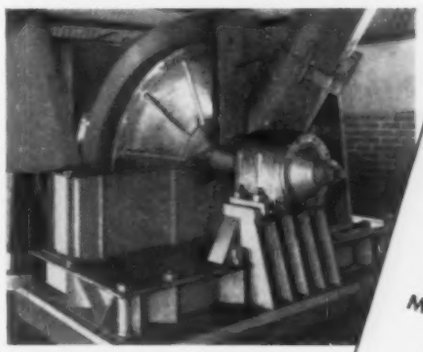
. . . It's easy—just let the barge unload itself. Here, 1,000,000 bd. ft. of logs take a dive as a self-dumping barge tips, causing them to slide into the water. To tip the barge, sea cocks are opened and water pours into side tanks. The barge lists and logs slide off. Relieved of load, the barge bobs up again and water drains from tanks back into the sea. Cocks are closed and the barge is ready for another trip—all in less than half an hour. Crown Zellerbach Canada uses the steel barges built by Burrard Dry Dock at North Vancouver and costing about $650,000.

Schedule SPCA Meeting

Annual meeting of the Southern Pulpwood Conservation Association will be held in Atlanta's Dinkler Plaza Hotel January 14 through 16.

Among topics set for discussion at the three day meet are forest land ownership in the South, encroachment of cull hardwoods on pine lands, prescription planting, success of the SPCA's "get acquainted" meetings and the upcoming Pulp and Paper Day.

SPCA President R. C. Barienbrock, of the Mead Corp., will deliver his address the morning of the 15th followed by the annual report of H. J. Malsberger, SPCA forester and general mgr.



Uniform, Clean-Cut CHIPS with Minimum Fines Minimum Bruising Minimum Maintenance

Carthage-Norman Chipper

The unique variable bevel of the knives and helicoidal surfaces of the disc permit the Carthage-Norman chipper to pull the log in at exactly the correct rate for a clean, sharp cut at all points along the cutting edge.

Consequently, at least 70% of the chips are at the specified length, sawdust is up to 1% less (a saving of $15,000 to $30,000 a year), and there is minimum bruising. Maintenance costs on the Carthage-Norman Chipper are exceptionally low.

CARTHAGE MACHINE COMPANY CARTHAGE, NEW YORK

Write for Bulletin CNC-1

Applying nitrogen fertilizer, Rayonier uses a Farmall hauling a farmer's spreader. This is plantation of 8 yr. old pines near Sanderson, Fla.

Fertilizing Techniques in South...

A new technique of fertilizing pulpwood forests with standard agricultural equipment has been developed by Rayonier Inc. in Florida, aiming to test responses to several types of fertilizer.

The Florida experiment is thought to be the country's first large scale forest fertilization program for comparing responses to several plant food carriers and rates of application. Supervising the experiment, conducted by Rayonier's Southeast Timber Div. in cooperation with Nitrogen Div. of Allied Chemical & Dye Corp., is Dr. T. E. Maki, professor of forest management at North Carolina State College.

Rayonier's experimental area was divided into 84 plots. Eighteen different treatments were given to 72 of the plots and 12 were used as control plots. Fertilizers applied at varying rates and in several combinations were urea, ammonium nitrate, ammonium nitrate-limestone, triple superphosphate and muriate of potash.

Detailed comparisons between trees in the control plots and the fertilized plots will be made in about five years and at intervals thereafter. Comparisons will also be made between size and general health of the fertilized trees now and later.

More recently Rayonier instituted a new study in nutrient uptake and annual growth by tagging infant pine trees with radioactive carbon 14, the first use of "hot" atoms in the forest products industry.

Rayonier also looks for the experiment to show the practicality of fertilizing nutrient-deficient soil, particularly in the South. There it has been estimated that some 15 million acres of forest land might well be made more completely productive through fertilization.

If successful, Rayonier believes this could provide the answer for future, increased world demands for cellulose and other forest products.

Forest fertilization, long practiced in Germany, is being given increasing attention in the U.S.A. Experiments are under way at North Carolina State, Syracuse, University of Washington, Michigan State, Purdue and Rutgers and government agencies.

New Southern Plant to Produce Chain Saws

Homelite, a division of Textron Inc., opened a new chain saw plant Nov. 25 in Gastonia, N.C. Eye-catching on the outside, streamlined and compact within, the new 360 square foot factory makes bold use of straight flow manufacturing techniques coupled with the latest automatic machinery.

It is strategically located to serve the Southern pulp and paper industry and pulpwood producers.

A one-story building, with a brief second story on top, the plant covers 143,000 sq. ft. of ground space and presents an almost windowless facade. It is of brick, concrete, and steel construction with long span steel joints supporting the roof to eliminate too many interior columns.

Graphic, pictorial testimonials, from progressive users, vouch for the exceptional job it is doing in handling pulpwood logs.

The OWEN BUCKET Co.
Breakwater Avenue Cleveland, Ohio

OWEN

PULPWOOD GRAPPLES

There is a strong possibility that your handling system can be modernized to benefit you the "Owen Way". Write today for all particulars and the latest catalog.

New York City
Philadelphia
Chicago
Berkeley, Calif.
Southern Corporation, Charleston, S. C.

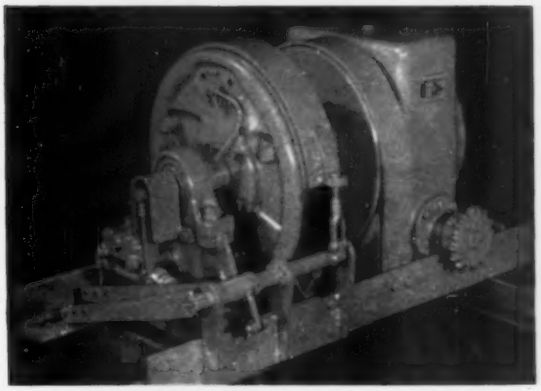
SAVE TIME · LABOR · MONEY

PRENTICE
Hydro-Loader

Loads and Unloads Pulp Trucks in Minutes!

Drive up to landing, load your truck in minutes—quickly—economically—safely. HYDRO-LOADER permits approximately 8 feet of loading space . . . has a swing radius of 12-14 feet. In transit the weight of the boom and bucket can be transferred to the front axle. The HYDRO-LOADER simplifies unloading in gondolas . . . will safely unload your truck quickly, with a minimum of effort. Each HYDRO-LOADER is a completely self-contained unit . . . rugged, powerful, designed to give mills the utmost in dependable service with a minimum of upkeep and repair. The complete unit is readily installed to any standard truck frame and can be removed without excessive expense or loss of time.

Free Spooling Power Winch



The unit can be furnished as an all-hydraulic unit with lifting capacity of approximately 3000 pounds, or the hydraulic hoisting units can be replaced with the free spooling power winch, illustrated above. This new power winch will increase lifting capacity above 3000 pounds. Write today for complete details and quotation.

Heikkinen MACHINE CO.
PRENTICE, WISCONSIN
Hydraulic and Mechanical Hoists for Truck or Tractor

Starting our second 100 years of making BETTER felts

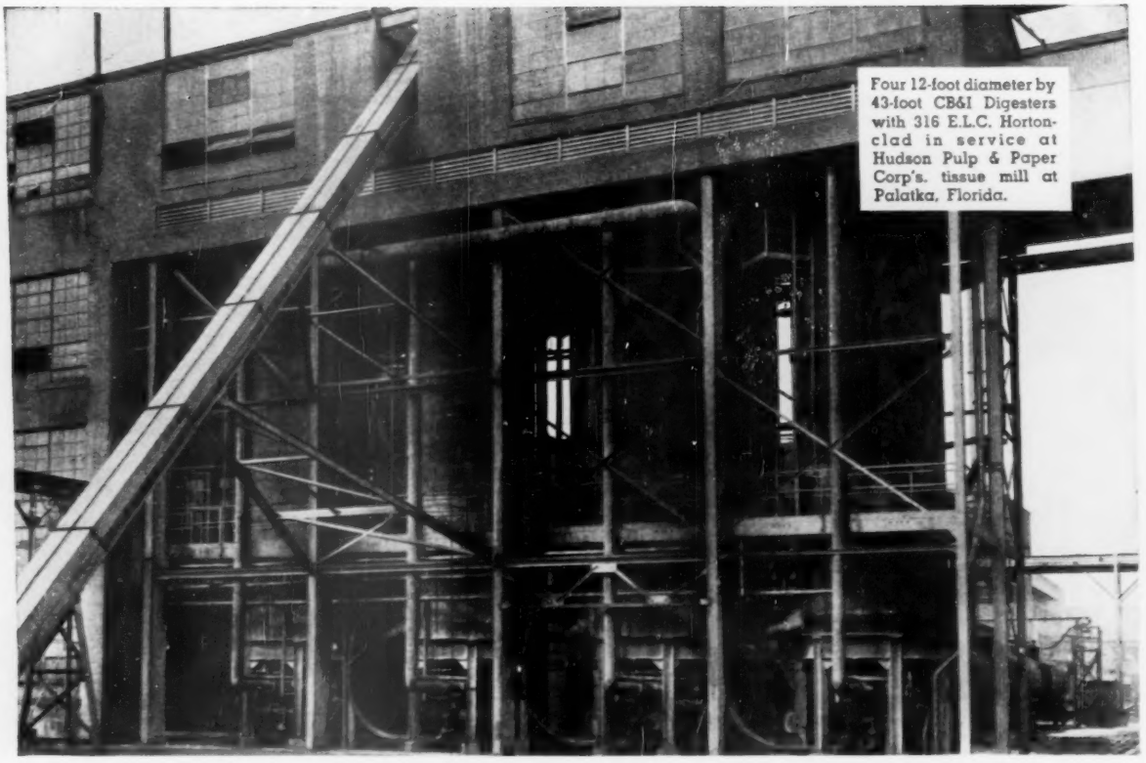
ONE of the advantages of a long-lived progressive company is that it has better trained, better skilled, loyal employees who have had time to develop pride in their work and build a tradition of quality. The fabric upon which these women are working has just been removed from the modern loom on which it was woven in a single strip. They are converting it into an endless belt. Their workmanship is so perfect that your eyes cannot see the "joining." This care is characteristic of every operation in the manufacture of Hamilton Felts—from the selection of wools through the finishing process. It explains why—after 5 generations you can't beat Hamilton Felts.

YOU CAN'T BEAT
Hamilton
FELTS

HAM FELTZ says,

"It's wonderful to be a hundred years old and as modern as Shuler & Benninghofen. If you have a problem that requires a new type felt, ask your Hamilton Felt Service Salesman. We'll be glad to design the felt that fits your needs."

SHULER & BENNINGHOFEN
HAMILTON, OHIO



Four 12-foot diameter by 43-foot CB&I Digesters with 316 E.L.C. Hortonclad in service at Hudson Pulp & Paper Corp's. tissue mill at Palatka, Florida.

HORTONCLAD®

better corrosion protection for clad vessels with high vacuum brazing process

These benefits with HORTONCLAD® . . .
• UNIFORM THICKNESS
• HIGH STRENGTH BOND
• CLEAN, CONTAMINANT-FREE SURFACE
• ADAPTABILITY TO ANY SIZE OR SHAPE

Hortonclad, available only in CB&I tanks, pressure vessels and other clad structures, is unlike other clad materials. The bond is accomplished by a flux-free high vacuum brazing process producing a clad plate with an integral and continuous bond of high strength. Uniform clad thickness results as both alloy cladding and backing are in their final thickness *before* bonding. Silver, stainless steels (both chromium and chromium nickel) nickel, and high nickel alloys such as Monel, Inconel, and Hastelloys B and F can be employed in the Hortonclad process.

In corrosive service, Hortonclad permits the use of higher temperatures, concentration and pressures —without the high cost of solid alloy vessels. For further information on its application, write our nearest office . . . ask for the *Hortonclad* bulletin.

CBI

Chicago Bridge & Iron Company

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston
New Orleans • New York • Philadelphia • Pittsburgh • Salt Lake City
San Francisco • Seattle • South Pasadena • Tulsa
Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PA.

PP-10

Midwest

Memo from DGC

BILL BROADWAY, representing DuPont Pigment Division, in Wisconsin has moved to 816 South Park Ave., Neenah, Wis., from his former residence in nearby Menasha. . . .

GEORGE H. WATKINS was elected vice pres. for design, public relations and foreign operations for Container Corp. of America. . . . JAMES R. ROBERTS is new research manager of Celotex Corp. . . . New department heads at Kimberly-Clark's Kimberly, Wis., mill are: CLAUDE CROSBY, paper mill supt., succeeding ED REITER who retired; DEXTER WOLFE, tech. supt., succeeding BOB GREENWALT who is in charge of the customer acceptance lab; and DICK NELSON who replaced VIC ZEUTHEN, as plant engineer. Mr. Zeuthen went to Neenah as asst. plant engineer—mill and engineering services. . . .

EDWARD T. GARDNER, JR., exec. vice pres. of The Gardner Board and Carton Co., Middletown, O., and COLIN GARDNER, III, vice pres. and gen. mgr., will become directors and vice presidents of Diamond Gardner Corp., formed by the company's merger with The Diamond Match Co. COLIN GARDNER, pres. of Gardner since 1954, and HAROLD E. WRIGHT, Gardner's vice pres. of sales, will also be vice presidents of the merged company. Other major changes in The Gardner Division, Diamond Gardner Corp.:

Fred Bahrenburg, Exec. V. P., Watervliet Paper . . .

. . . he continues as plant mgr. of Hammermill's Erie, Pa., mill and as Hammermill director. He is also asst. gen. mgr. and a director of the Watervliet, Mich., company, a Hammermill subsidiary. For several months he will devote time almost exclusively to Watervliet. A pulp and paper graduate of Syracuse U., he joined Strathmore Paper Co. in 1930, where he rose from asst. chemist to asst. to the president. With Hammermill, he started in tech. paper sales in 1948. . . .

George McGregor, Plant Mgr., Crandon Paper Mills, Inc. . . .

. . . heading Fort Madison, Ia., plant rehabilitated at cost of $2,000,000, now making semi-chemical corrugating medium (30,000 tons annually), based on new Tree Farm movement in Ill.-Ia.-Mo. Born in Cloquet, Minn., he graduated from Wisconsin with b.s. in chemistry, m.s. in chem. eng., later earned fellowship from The Northwest Paper Co., where he was tech. director. He was instructor for three years at Institute of Paper Chemistry and senior chem. engineer at U.S. Forest Products Laboratory. He passed up ph. d. (although all work in it was completed except oral exam) to go west as supt., later tech. director for Weyerhaeuser Pulp Division. He later headed Swenson Evaporator Co. pulp and paper dept., was research executive at Minnesota & Ontario Paper Co. and recently supt. at Columbia River Paper Mills. For years he was chairman of TAPPI's sulfite pulping committee.

RICHARD L. SIEGEL has been promoted to vice pres. and gen. mgr.; BRUCE W. MARTIN administrative vice pres.; WILLIAM AIKEN director of research development for the General Products Group of Diamond Gardner; and DELBERT C. MEYER director of engineering filling post held by ARTHUR R. HARVEY, who retires. . . . RICHARD R. GROWDON, senior engineer, becomes chief draftsman at The Mead Corp.'s Chillicothe, O. mill. ROBERT L. BOEHM, tech. asst. to the manager at Wheelwright Div., Leominster, Mass., is now asst. tech. director at Chillicothe. . . . GLENN PIKE was appointed supervisor of production planning and control for the Ahdawagam Board Div. of Consolidated Water Power & Paper Co. HAROLD SCHADE succeeds Mr. Pike as supervisor of cost and service functions, controllers dept. . . .

HAROLD E. HEWITT, asst. personnel mgr. at Bemis Bro. Bag Co., Peoria, Ill., received the National Safety Council's President's medal and the Certificate of Award, issued by the President of the U.S. through the American Red Cross, for applying artificial respiration and reviving a man who was struck by lightning last summer. . . .

THOMAS A. MOORE, officer and director of Whiting-Plover Paper Co., Stevens Point, Wis., and director of George A. Whiting Paper Co., Menasha, Wis., died recently at the age of 65. . . .

THOMAS B. BECNEL, formerly chem. supervisor at St. Louis sales office of The Dow Chemical Co., now heads the alkali section of the chlor-alkali sales group in Midland, Mich., under the supervision of KEN WILDES, mgr. of chlor-alkali sales. E. TED MANN succeeds Mr. Becnel in St. Louis. . . . GEORGE W. LAMBERTSON was promoted to divisional sales mgr. at the Cincinnati home office of Lunkenheimer Co. JACK W. MONTGOMERY, sales rep at Chicago, succeeds Mr. Lambertson as Chicago branch mgr. . . .

Steve Baisch, Consulting Engineer Starts a New Career . . .

Stephen J. Baisch, who has been the top engineer overseeing a decade of almost continuous expansion at Thilmany Pulp & Paper Co., has decided to hang out his own shingle as a consulting and development engineer.

During these years at the Thilmany mill, "Steve" Baisch has held the title of chief design engineer, in charge of the engineering dept., and he has been responsible for the overall engineering for three new paper machines (Nos. 10, 11 and 12), as well as for a new woodroom, new screen room, new brown stock washing installation, relining and replacement of digesters, converting machines and warehouses.

This rich background of experience will serve him in his new activities, operating out of his new office, 104 E. 2nd St., Kaukauna, Wis. He terminates his activities with Thilmany on Jan. 15.

Born in Ironwood, Mich., Oct. 28, 1917, Mr. Baisch graduated in mech. eng. from the U. of Wisconsin, 1942, and served as an army major in African, Sicilian and Italian campaigns and landings in World War II. He joined Thilmany in 1945.

Strictly Personal

New Faces at Muskegon . . .

F. W. ROBERTS, gen. mgr. of S. D. Warren Co. Central Mill at Muskegon, Mich., brings us up to date on personnel changes made there during the past year and a half. GORDON SANDO is purchasing agent. He was formerly with Marathon Corp., Oswego, N. Y. Technical assistants are WILLIAM H. MARRA, who came from S. D. Warren's Cumberland Mills in Maine, and RICHARD TARR, a Syracuse Univ. graduate. D. R. COLLIN is director of industrial relations and JACK TRUMP is personnel assistant and editor of the mill publication. GEORGE IBERSHOFF is new staff man in engineering. PHILIP HINKLEY, graduate of Univ. of Maine and formerly at Cumberland Mills, is bleach plant and pulp mill supt. GERALD SOULE is instrument technician. ARNOLD CLIFF is in charge of the electrical dept., assisted by HARVEY BRAGDON. Both were at Cumberland Mills. CLAUDE J. BOS, formerly of St. Regis Paper Co., Kalamazoo, Mich. became asst. supt., coating dept. CLIFFORD J. CURRY is finishing dept. foreman and MICHAEL PELLETIER is plain sorting foreman. Also from Cumberland Mills are ROY E. HEYWOOD, order dispatching and planning dept., and R. H. MCBRIDE, paper machine supt. (he was asst. supt. at Cumberland). ROGER RIDLEY is quality inspector. Coating dept. foremen are RICHARD DANIE, HERBERT PEARSON and ROBERT LAVIGNE. ROBERT G. KNOX is cost accountant. Paper Machine Foreman VERNON LIBBY and NORMAN ROBINSON of the print shop were formerly at Cumberland Mills.

Meet Huyck's
WICKER

Dr. Dan B. Wicker is Huyck's Director of Physical Research and Development. His extensive work on scientific instruments to measure felt performance quantitatively on paper machines enables Huyck to apply advanced techniques to custom-engineer felts for a precise job. Dan was previously associated with Eastern Corp. and Thilmany Pulp & Paper Co. A graduate of the Institute of Paper Chemistry, he provides the experienced leadership that assures the latest and best felts for all papermakers.

HUYCK FELTS

First in Quality . . . First in Service Since 1870

Ken Forrest Dies In Israel on Mission

Kenrick A. Forrest, veteran pulp and paper industry consultant of 901 Garver St., Roaring Spring, Pa., who has made investigations and done industry work in many countries, died suddenly in November in Jerusalem, Israel.

Mr. Forrest went there at the invitation of the Israel Ministry of Commerce and Industry to advise it on possibilities for expansion in pulp and paper manufacturing.

Osborne Becomes Chairman Of Institute Trustees

Ernst Mahler has retired as chairman of trustees of The Institute of Paper Chemistry, after heading that body 28 years. He was named honorary chairman and continues as senior trustee. W. Irving Osborne, Jr., Cornell Paperboard Products, was elected the new chairman and David L. Luke, West Virginia Pulp and Paper Co., the vice chairman. Re-elected as officers were John G. Strange, president and treasurer; Harry F. Lewis, vice president; and Wendall H. Smith, secretary.

F. Talmage Edman, Weyerhaeuser Pulp Sales

. . . Tal Edman, born in Pittsfield, Mass., and graduate of Yale, 1950, is working out of the Chicago office, under direction of Spencer Smith. Tal started in the paper industry in Corinth, (N.Y.) mill of International Paper Co., and after 5½ yrs. in various mill jobs and customer service work, he went into fine paper sales for I.P., working out of Chicago for one year. His wife is the former Mary Rockwell Reynolds. They have two children.

Bob O'Connor Exec Secy.

ROBERT E. O'CONNOR has been officially made executive secy. of American Paper and Pulp Assn., by action of its governors and executive committee. He was serving as acting exec. secy. since TED TINKER's death Aug. 31. Mr. O'Connor has been with APPA for ten years, serving as secy. of several committees and as assistant exec. secy. His wife, the former Marcella Hogan, and four children live in Greenwich, Conn. He graduated from Quens College, New York, and earned an LL.b. at Columbia Law School.

Jack Wilcox to Chairman 1958 Engineering Conference

Mr. Wilcox, manager, process equipment div., Electric Steel Foundry Co., has been named general chairman of the conference to be held July 28-Aug. 1 in Portland, Ore. The entire program for the conference has been planned and most speaking assignments made. A tour will be made of a Crown Zellerbach Tree Farm near the Oregon Coast (ladies invited), followed by three days of technical sessions, Camas, West Linn, Longview and other mill visits are planned.

Pre-registration plan will be very important, said Mr. Wilcox. Two or three months before the conference, registration forms will be mailed to those who attended previous conferences to assist in advance planning and save time. Those planning to attend may write the registration chairman, Wayne Mitchell, Link-Belt Co., 3030 N.W. Industrial, Portland, Ore.

Committee Chairmen . . .

. . . for the 13th Engineering Conference in Portland, Ore.; *Secretary & Printing:* KAY FRALICK, Morden Machines Co.; *Treasurer:* ROBERT SMYTHE, Ray Smythe Co.; *Hospitality:* JOHN SHAFFER, Reliance Electric & Engineering Co.; *Registration:* WAYNE MITCHELL, Link-Belt Co.; *Program Arrangements:* PAUL HENRY, The Flox Co.; *Publicity:* DAN G. JOHNSON, JR., Electric Steel Foundry Co.; *Plant Tours:* VIRGIL SUTHERLIN, Longview Fibre Co.; *Transportation:* GORDON PETRIE, The Black-Clawson Co.; *Ladies' Program:* MARY HONEYMAN, Modern Machines Co., and DEAN BROSCHE, Corn Products Co.; *Housing:* F. O. BOYLON, Crown Zellerbach Corp., and JAMES MCCULLOUGH, Pennsylvania Salt Mfg. Co.; Migratory Peddlers *Breakfast Skit:* JOHN AYRES, DuPont Co., and *Woods Trip:* GEORGE SCHROEDER, Crown Zellerbach Corp.

McCarthy ..... Crowder ..... Reed

St. Regis Promotes Three . . .

LAWRENCE C. CROWDER was appointed chief engineer, pulp and paper div., St. Regis Paper Co., succeeding JUSTIN H. MCCARTHY who has been v.p. and chief engineer and now becomes v.p. i/c engineering—pulp and paper. DR. ROBERT W. REED was appointed to the new post of staff planning engineer. He will report to Mr. McCarthy and will have his headquarters in the engineering offices at Jacksonville, Fla.

Southern

Memo from WFD

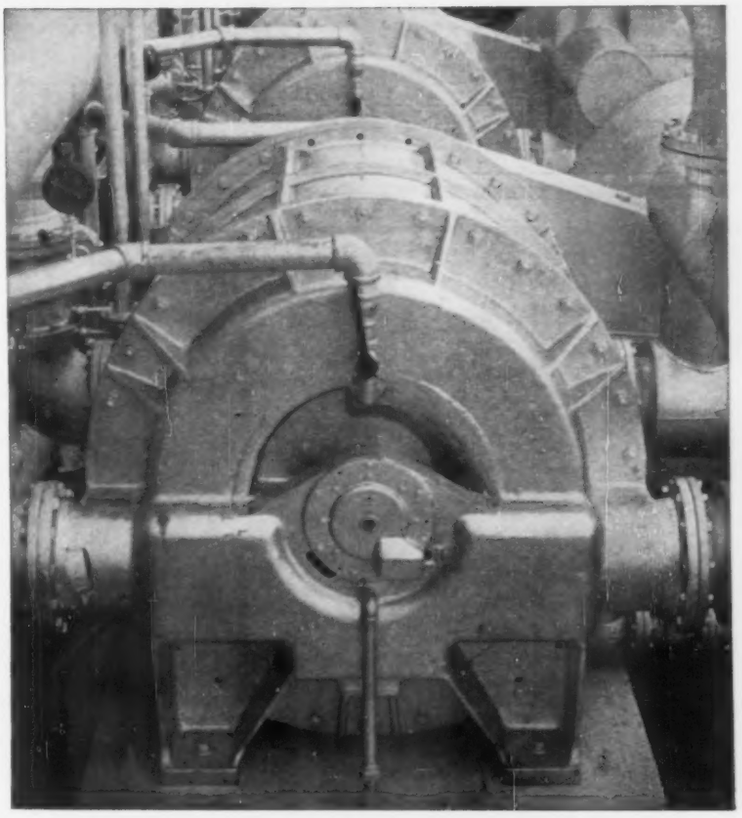
The Southern Exposure: DENNIS E. COUSINS, v.p. of Scott Paper Co. for the past three years and former executive with Hollingsworth & Whitney before its merger with Scott in 1954, has retired. Mr. Cousins spent 38 years in the paper industry, was plant mgr. at the H&W mill in Mobile in 1938, became a v.p. in 1950. Before this he was manager of the Tacoma, Wash., Kraft mill of Union Bag (now St. Regis). He will continue to live in Mobile.

G. J. BRABENDER, former tech. dir. at Marathon's Rothschild mill, has moved to Butler, Ala., to take over as asst. plant mgr. of the new mill in Naheola . . . Allis-Chalmers Industries group has announced some changes—C. W. PARKER, JR., mgr. of the Richmond district since 1955, moves to Philadelphia, succeeding A. D. BROWN who is now on the regional office staff. J. M. MATHEWS is successor to Mr. Parker as mgr. of the Richmond, Va., district and GORDON HOOD, onetime sales rep in Baltimore, will take over as mgr. of the Charleston dist., succeeding Mr. Mathews.

RAY MARSH, a graduate of the U. of Maine, has been appointed pulp and paper project engineer for Walter Kidde, Engineers—Southwest in Houston, Tex. He joined the Kidde organization in 1951 . . . H. R. MAY and Co., Inc., has been appointed sales representative for south Texas and southwest Louisiana by the J. F. Pritchard Co., makers of cooling towers and dehydration units . . . Hercules Powder Co. has moved its New Orleans office to 830 Saratoga Building, New Orleans 12—W. E. (BILL) HAMILTON continues as its mgr.

VICTOR P. TABAKA, management and

High machine speeds? High temperature headbox stock? You need NASH Vacuum Pumps!



Air from the suction rolls on paper machines carries with it substantial quantities of moisture. This considerably reduces the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump, because of the unique principle of operation, the bulk of this vapor is effectively condensed inside the pump. The total capacity of a Nash is therefore increased.

When you specify a Nash Pump it can be closely sized to the job. It is not necessary to select an over-sized unit, because the rated capacity of the Nash may be relied upon.

That is one of the reasons why Nash Vacuum Pumps are installed in over a thousand leading Paper Mills. An engineer from Nash will be glad to survey your mill, and make recommendations, entirely without obligation to you.

NASH ENGINEERING COMPANY

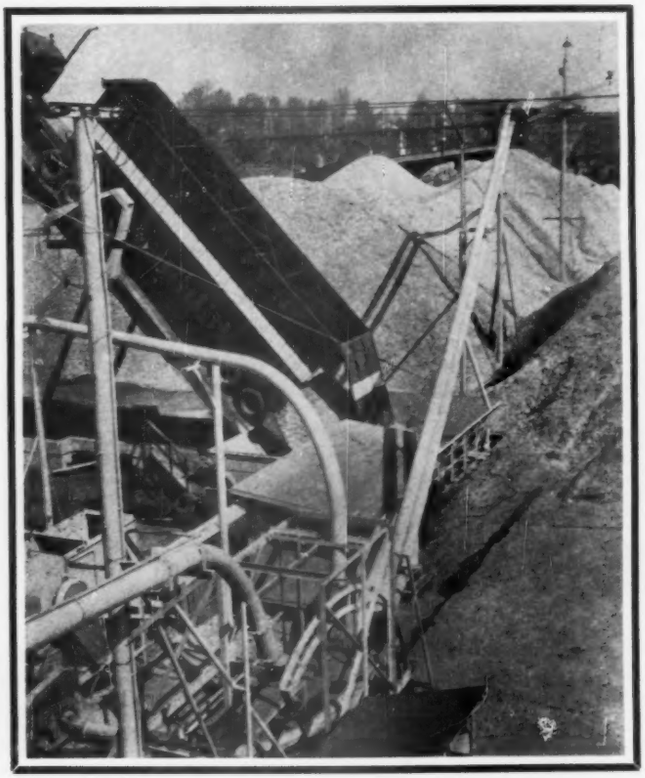
441 WILSON ROAD, SO. NORWALK, CONN.

Strictly Personal

personnel specialist, has been named v.p. in charge of administration at Gulf States Paper Corp., Tuscaloosa, Ala., and has been elected a director. He was, until recently, owner-dir. of Victor Tabaka Assoc., management consultants in Atlanta at Emory University . . . J. R. STEIN, who started his career with Dow Chemical Co. in 1937, has been named gen. mgr. of its Louisiana div. facilities, still under construction near Baton Rouge.

Q. W. VANCLEAVE, Georgia Tech graduate, has become a member of the technical services dept. Crossett Paper Mills. He was recently discharged from the Marines. Also new in Crossett's Technical service dept., JAMES MCLAURIN, a recent chem engineering graduate from Mississippi State . . . GEORGE NELSON, project engineer at IP's Natchez mill, was recently promoted to rank of lieutenant in the naval reserve . . .

H. T. (SIKI) SCORDAS, formerly supt. of Union Bag-Camp's Lakeland, Fla., box plant, has moved to New York to the Board Sales Dept. where he will deal in the technical aspects of board sales. Succeeding him at Lakeland: ARTHUR ALLEN, former shift supt. at the Savannah box plant.



CUT CONVEYOR COSTS

One Rader chip conveyor does multiple duty for the Oregon Pulp and Paper Company in Salem, Oregon; builds open storage with segregated species, reclaims from open storage to four inside chip bins 700 feet away, or reloads trucks for transfer to another mill.

RADER PNEUMATICS, INC.

1739 N. E. 42nd Avenue Portland, Oregon

Vancouver, B.C. 4645 Main St. | Preston, Ont. Canada | Eureka, Cal. Box 61 | Boston, Mass. No. 10 High St. Rm. 716 | Memphis, Tenn. Box 3722 Municipal Airport

Owens-Illinois Announces Execs, Mill Managers, Supts.

Headquarters of National Container Corp., Owens-Illinois Glass Co. subsidiary, as well as the Mill and Multiwall Bag Divisions of Owens-Illinois are now established in O-I headquarters in Toledo, O., announces Hugh C. Laughlin, executive vice president of O-I, who is also chairman of National and president of the Mill and Multiwall Bag Divisions. L. R. Edwards is president, National.

Headquarters of National were in New York, the Mill Division at Jacksonville, Fla., and Bag Division at Jaite, O.

In Toledo are J. D. Northup, vice president of all three, sales mgr. of the Mill Division, and gen. mgr. of the Bag Division; Max Ackerman, comptroller for the three, and D. B. Malcolm, director of personnel administration.

PULP & PAPER previously reported the moves to Toledo by C. G. McLaren, vice president of O-I and gen. mgr. of mills and woodlands, and F. B. Schelhorn, vice pres. mfg. National executives in Toledo include F. W. Wallis, vice pres. production.

General research activities of the Mill Division also are established in Toledo at the O-I Technical Center. Owens-Illinois spends more than $11,000,000 annually for research and engineering. P. E. Shick is research director and C. P. Spring is quality control director.

Others now in Toledo include George W. Abel, technical director of forestry; D. J. Brett, Jr., personnel mgr.; Fred A. Adams, division engineer; Douglas Hotch, asst. to comptroller; and R. E. Adams, staff engineer; Ralph Wood and Bob Gilmer, purchasing dept.; T. W. Carroll, industrial engineer; W. R. Winters, M. A. Kistler, E. J. Ciha, and R. H. Horst, production scheduling for mills.

Regional executives in Jacksonville, Fla., are Guy H. Wesley, mgr. of the Southern Woodlands Division, and K. M. Cherry, former mgr. of the Tomahawk, Wis., mill, now mgr. of linerboard mills (Jacksonville and Valdosta).

Mill Division plants executives are:

Big Island, Va.: J. W. Haley, mill mgr.; J. C. Theiler, asst. mill mgr.; Cecil B. Curry, gen. supt.

Jacksonville, Fla.: W. B. Hobbs, Jr., mill mgr.; R. W. McCormick, gen. supt.

Tomahawk, Wis.: John E. Hoeft, mill mgr.; Carl E. Stoke, gen. supt.

Valdosta, Ga.: W. C. Hayes, mill mgr.; and Glenn Ralston, gen. supt.

Reading, Pa.: George F. Ravel, mill mgr.

Erickson, a Rayonier Exec. V. P.

. . . Russell F. Erickson has been a vice president of Rayonier Inc. since 1950, and for the past two years in charge of manufacturing and engineering. Clyde B. Morgan is president. Mr. Erickson directed design and placing in operation of several major additions to company facilities. He joined Rayonier as chief engineer at Fernandina Beach, Fla., in 1946, became plant mgr. in 1948. A graduate in m.e., U. of Minnesota, he was an engineer with Minnesota & Ontario Paper Co., George F. Hardy, consulting engineers, and Hollingsworth & Whitney. The other exec. v.p. of Rayonier is James T. Sheehy.

Northeast

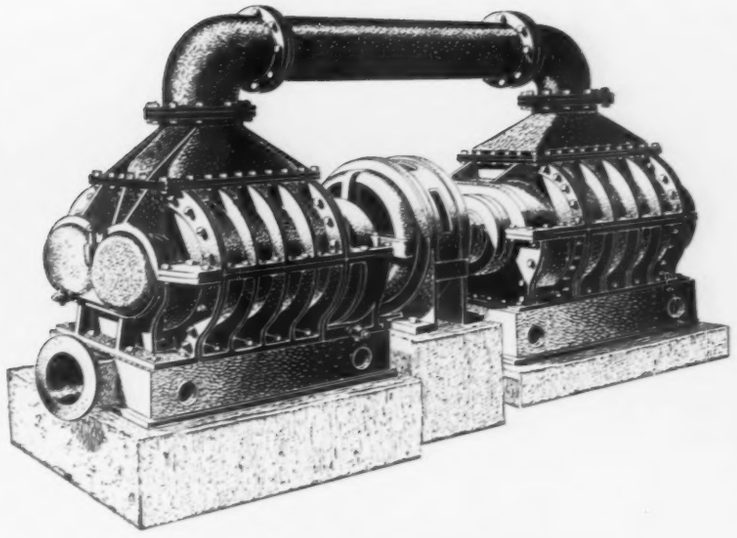
Memo From MRC

A highlight of trip to Maine was a lobster stew party for Great Northern personnel and St. Regis guests (Bucksport Mill's FRED GOODWILL and FRED SPRAGUE). Present were PETE HEUER, now GNP's mgr. of mfg., and DICK OSBORNE, new tech. dir.; BOB PREBLE, personnel mgr., RUSS YORK, safety director (Millinocket) and R. WITHAM, sulfite supt., Millinocket (grandson of FRED WITHAM of pulp and papermaking fame). Host was BART TAYLOR, Buckman Laboratories. Chief chef was GEORGE BEMIS, of St. Regis woodlands. . . .

Staff members of Kimberly-Clark Corp.'s New Milford mill, and their former locations, are: WILLIAM FIEWEGER, mill mgr., Munising, Mich.; CHARLES ILTIS, operating supt., R&D, Neenah, Wis.; CARLISLE COOK, ind. rel. supt., Niagara Falls, Ont.; KARL PENNAU, staff supt., Fullerton, Calif.; WILLIAM MCNAIR, adm. supt., Niagara Falls, Ont.; WILLIAM SENSENBRENNER, planning, traffic supervisor, Memphis, Tenn.; LEO MOERSEN, industrial engineer, Niagara Falls, N.Y.; RALPH MADDEN, mill engineer, Memphis, Tenn.; and QUINTIN NARUM, mill chemist, R&D, Neenah, Wis. . . .

JAMES BERRYMAN transfers to the Potsdam mill of Nekoosa-Edwards Paper Co. as coordinator of systems, procedures and policies. He has been supervisor of systems and procedures at Port Edwards since 1954. . . .

Improved maintenance efficiency is promised at Hammermill Paper Co. with three promotions: MERLIN J. (CRACKER) SMITH is asst. maintenance supt; ROBERT



R-C high speed vacuum pumps cost less to install and operate

Outstanding performance over many years in hundreds of applications in paper and other process industries have built a strong preference for Roots-Connersville vacuum pumps.

- Reduced horsepower at higher speeds (600 rpm and up) saves as much as 25% in power and lowers the cost of motors.
- Minimum sealing water required, from 4 to 40 gpm. Performance is unaffected by water temperature.
- Straight spur gears permit operation without axial thrust, reducing maintenance and holding downtime to a minimum.
- Internal parts readily accessible for inspection without disturbing impeller clearances.
- Compact units require small floor space and less expensive foundations.

R-C vacuum pumps are supplied in single-stage or compound units to meet any capacity requirement. For specification data, write for Bulletin 50-B-13.

Engineers—unusual career opportunities await you at Roots-Connersville. Address your resume to Professional Employment Manager.

ROOTS-CONNERSVILLE BLOWER

A DIVISION OF DRESSER INDUSTRIES, INC.

158 Willow Avenue, Connersville, Indiana. In Canada—629 Adelaide St., W., Toronto, Ont.

Strictly Personal

H. WEISENFLUH moves to planning engineer; EDWARD L. GLOVER to area engineer. . . . In the paper mill, machine-tender DONALD C. SANNER takes over as paper mill supervisor. . . .

Hammermill's industrial relations director ANDY SHANER not only won the Erie area senior men's golf championship for the third time but became Erie's first USGA senior district champion. He was beaten in the national senior championship by CHICK EVANS. . . .

WILLIAM V. HANSON, asst. production mgr., Champion-International Co., has been promoted to rank of lt. commander, U.S.N.R. . . . WALTER L. GRIMM steps up as asst. supt., Castanea mill of New York and Penn; H. DEWEY FLORUS to paper machines tour foreman; G. FREEMAN, to pulp mill tour foreman of Lock Haven pulp mill and NERR T. HANNA was named supply foreman at Castanea.

Pacific Coast

Memo from LHB

CHAS. H. INGRAM, retiring as of Jan. 1 as exec. vice pres., Weyerhaeuser Timber Co., continues as executive committeeman and a director. The position of executive v.p. is discontinued. Major staff executives reporting to Pres. F. K. WEYERHAEUSER are: W. P. GULLANDER, financial v.p.; J. E. NOLAN, v.p. and general counsel; C. D. WEYERHAEUSER, mgr. of forestry, lands and timber; and JOHN L. ARAM, v.p. and asst. to the president. Operational executives reporting to the president are: HOWARD W. MORGAN, v.p., with responsibility for all pulp and paper production and sales; GEORGE H. WEYERHAEUSER, in charge of forest operations, lumber division production and the engineering dept.; and JOHN M. MUSSER, v.p., who will continue to direct the Thompson Yards. LOWRY WYATT, recently appointed director of personnel, also reports to the president. . . .

T. H. HOWE, central planning mgr. for Kimberly-Clark Corp., was appointed mgr. of the Fullerton, Calif., plant, succeeding J. A. MURPHY. Mr. Howe joined K-C in 1939 and was supt. of service operations and production mgr. at the Neenah, Wis., mill. . . . FRED P. RITCHIE was appointed plant mgr. of Container Corp. of America's new paper mill at Santa Clara, Calif. Mr. Ritchie is a 1945 graduate of the U.S. Naval Academy at Annapolis. . . .

M. C. KAPHINGST, sulfite supt. at Columbia River Paper Mills since 1944, died Sept. 29 following an extended illness. CLYDE M. LIESER, formerly asst. to Mr. Kaphingst, has been promoted to sulfite supt. . . .

At the annual Paper Mill Men's Club Hi-Jinks, premier social event among paper mill men and jobbers in Southern California, ASA L. MURRAY JR. of Oregon Pulp & Paper Co., president, was chief host. JACK COURTNEY of Crown-Zellerbach was chairman. Low gross golf was by PAUL A. WEIR of Pak-Well Paper Products Co., and low net honors went to BILL KAN, Globe Paper Co.

G. F. GREEN, chief chemist at Fibreboard Paper Products Port Angeles mill, promoted to paper mill supt. as successor to CHARLES F. MEAGHER who retired Dec. 1 after 40 years with Fibreboard and 50 years with the industry; DAVID L. MOSHER was upped to chief chemist. . . . LAUREN LAFOND, sulfite supt. of CZ Lebanon plant, was presented 35-year award by HERB WYMORE, manager-direct converted papers, CZ San Francisco. . . . C. E. BRUNER, res. mgr. of CZ West Linn plant 1930-45, died Oct. 25 at age 74. . . . . JOHN PLANKINTON, Western-Waxide divisional purchasing agent, San Leandro, promoted to assistant res. mgr., W-W, St. Louis. . . .

Ashby . . . . Winchell . . . . Gilham

Changes in Westminster Paper Co.

. . . have resulted from the company's recent acquisition of Crabtree Mills, Ltd., Howard Smith Paper Mills subsidiary, in Quebec. Pres. E. M. HERB announces JOHN ASHBY, vice pres. and director and member of the exec. committee, has been appointed vice president for operations and will move to Montreal where he will direct integration of Crabtree Mills division. He will maintain overall direction of all company manufacturing activities. HORACE F. WINCHELL, who joined Westminster Paper Mills soon after it became affiliated with Scott Paper Co., has assumed chief operating responsibility for Western production, and J. S. GILHAM will continue as plant manager at Crabtree Mills.

Canada

Memo from CLS

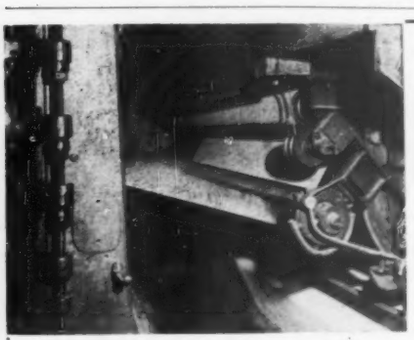
VERL THOMPSON is now safety coordinator of the Kimberly-Clark Pulp and Paper Co. Ltd., mill at Terrace Bay, Ont. (this was formerly LongLac Pulp and Paper Co., Ltd., but the name was changed recently; it always has been a Kimberly-Clark subsidiary). As reported last month, FRED SOUGHTON, who had been safety coordinator since the mill was built, is now training coordinator. Mr. Thompson was in maintenance planning. JOSEPH C. WIG is mill mgr. at Terrace Bay. . . .

I. H. (HARRY) ANDREWS, who has been vice president, mfg. and tech. services, Powell River Co., Vancouver, B.C., for several years, has been appointed vice president of planning research and development, reflecting the company's policy to place greater emphasis on product research. . . .

CLIFFORD CRISPIN, who joined MacMillan in Vancouver as a salesman 31 years ago, was named vice pres., sales, of MacMillan & Bloedel. Until recently he was vice pres., pulp. He was manager of the company's Harmac bleached sulfate mill when it was first built. . . .

WESLEY F. COOK was elected vice pres. of Kimberly-Clark Corp. of Canada, Ltd., joining the Toronto staff this fall. He has been asst. to the exec. vice pres. since 1955. H. C. LAUNDY was appointed personnel supt. of Kimberly-Clark Products Ltd., Niagara Falls, Ont. . . .

D. S. ABBOTT, president of Howard Smith Paper Mills, appointed W. P. NESBITT as mgr., of the Cornwall div., Cornwall, Ont. C. L. TOMLINSON was named asst. mill mgr.



Improve Paper Quality
with
DUPASQUIER DRIPLESS STEAM SHOWER PIPE

- WET END—breaks up bubbles, disperses foam
- DRY END—increases sheet moisture, improves finish, lowers bulk and caliper
- SAFELY USED anywhere dripless steam desired

Custom Built for Any Machine
U.S. Pat. No. 2642314,
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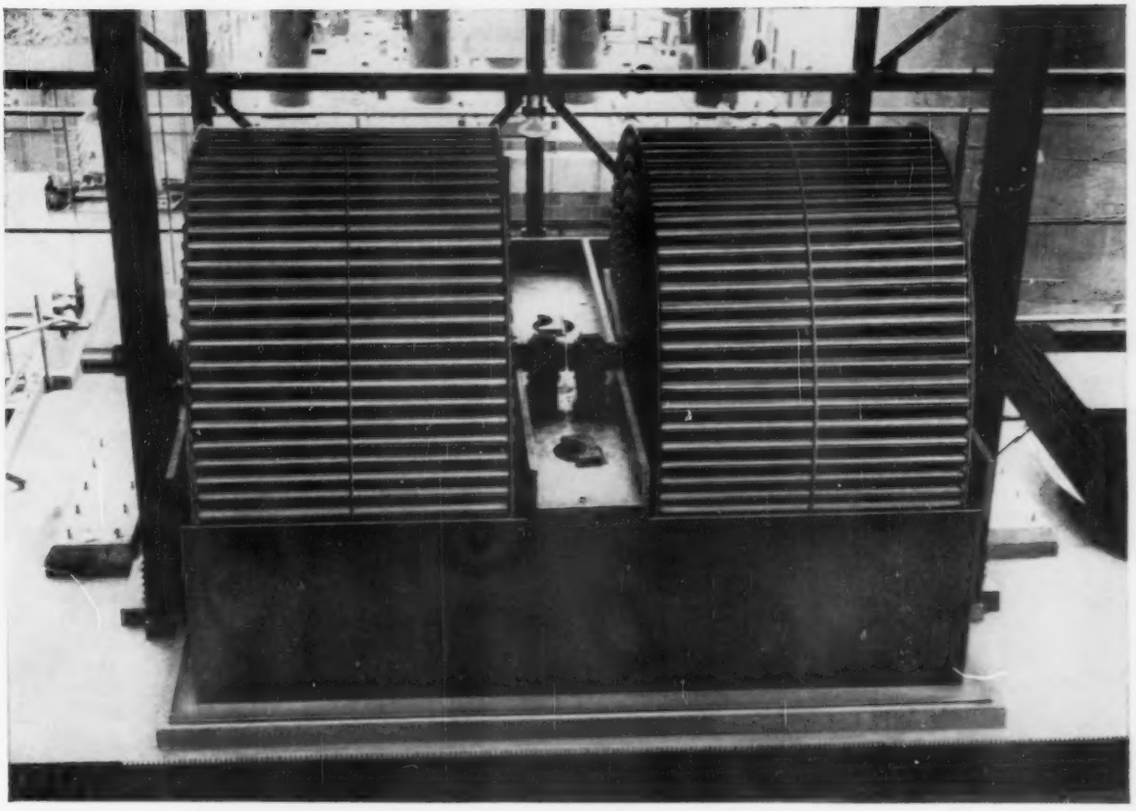
J. H. DUPASQUIER 560 E. Clarendon St. Gladstone, Oregon



NEWS ABOUT THE CASCADE EVAPORATOR

The most widely used direct contact evaporator for pulp mill black liquor recovery units

C-E now has exclusive sales and manufacturing rights to the Tubular Cascade Evaporator. Long favored in pulp mill practice, there are more than 120 recovery units, in service or on order, that use this unit. This represents a very substantial percentage of all the direct contact evaporator capacity purchased by the industry.

This overwhelming preference is due, in large measure, to the inherent advantages of this unit. These are: —

HIGHEST liquor concentration

lowest power input

HIGHEST availability

lowest maintenance

HIGHEST efficiency

lowest chemical losses

In addition, the unit is self cleaning and offers maximum degree of flexibility. That these advantages are real is evidenced by the fact that of the total number of Cascade Evaporators sold, more than 50% represent repeat orders.

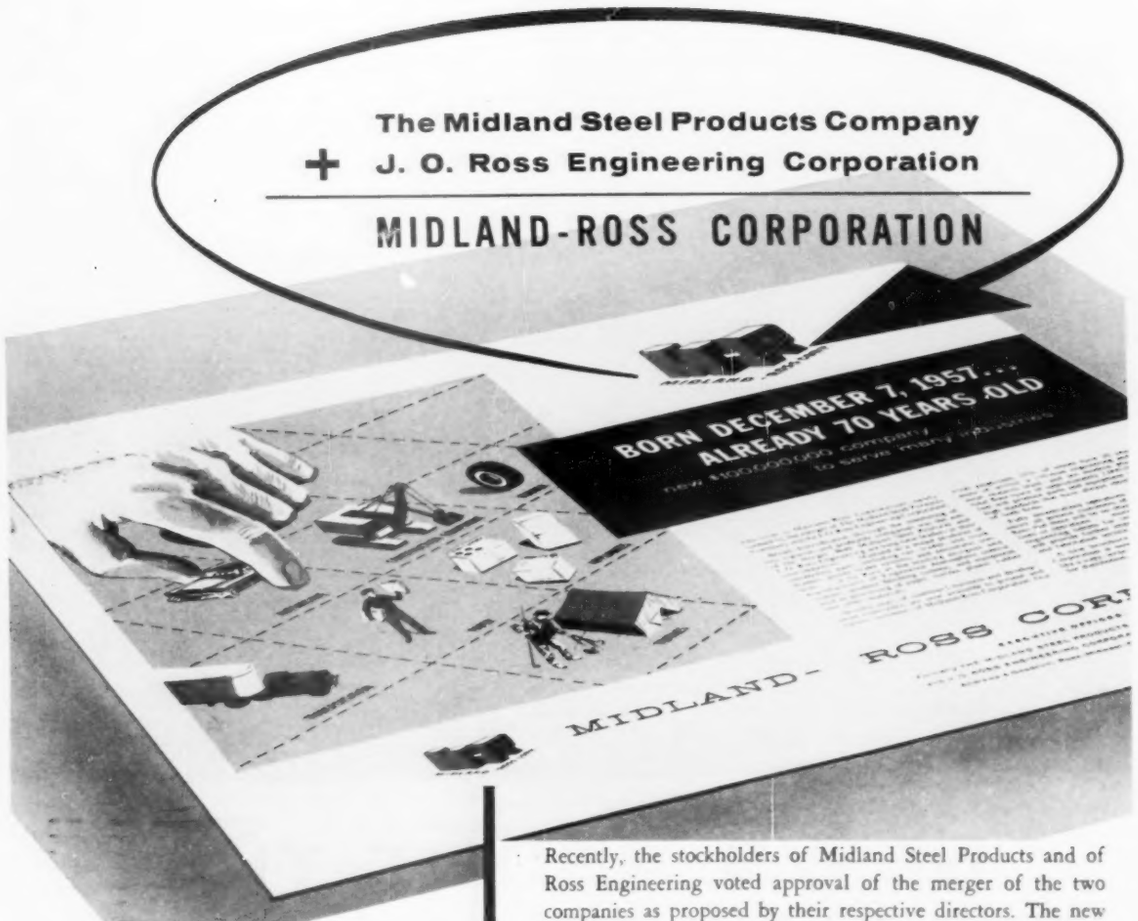
C-E will welcome your inquiry concerning the Cascade Evaporator —whether it be for use with a new recovery unit or for an existing installation. For more information, contact our Paper Mill Division.

COMBUSTION ENGINEERING

Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.

C-137

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING EQUIPMENT; PRESSURE VESSELS; SOIL PIPE



This Significant Merger involves No Lessening of Pre-Merger Services

Recently, the stockholders of Midland Steel Products and of Ross Engineering voted approval of the merger of the two companies as proposed by their respective directors. The new corporation is Midland-Ross Corporation. Often mergers change things, but in this case, there is no lessening of or deviation from pre-merger service. In fact, with the combined engineering, research and development skills, there will actually be a broadening of service.

Ross Engineers . . . the same Ross Engineers you know . . . will continue to work on problems involving 'Engineered Atmospheres' as they relate to drying, baking, curing, converting, heat-treating and similar operations. The Ross Service will be as comprehensive as before. . . experienced specialized engineering, modern manufacturing facilities . . . all in the field of Engineered Atmospheres.

The same service policy applies to the subsidiaries or affiliates listed in the shield shown below. The only change in the entire family of Ross Complementing Services is that J. O. Ross Engineering is now a division of the new corporation. Ross Service will continue as if nothing corporate-wise has taken place.

THE ROSS GROUP
OF COMPLEMENTING SERVICES

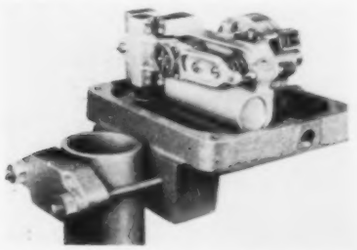
J. O. Ross Engineering, New York
Andrews and Goodrich Division, Boston
Ross Engineering of Canada Limited, Montreal
Ross Midwest Fulton Corporation, Dayton
Carrier-Ross Engineering Company, Ltd., England
John Waldron Corporation, New Brunswick, N. J.

J. O. ROSS ENGINEERING
Division of The Midland-Ross Corporation

444 Madison Avenue, New York 22, N. Y.
ATLANTA • BOSTON • CHICAGO
DETROIT • LOS ANGELES • SEATTLE

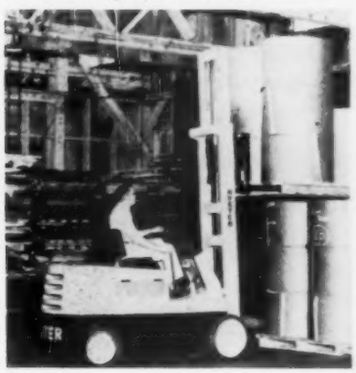
PULP & PAPER New Equipment and Supplies

Transmitters . . .
. . . For Temperature, Pressure



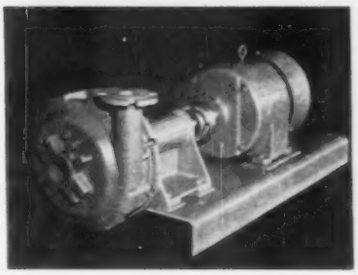
Applications: For transmitting temperature and pressure readings.
Advantages: Can be mounted in any position without positional error. Unit sub-assembly permits removal of sub-assemblies without disturbing beam assembly. Thermal systems and pressure elements are readily removed for change of range span. Large pilot capacity insures fast operations even with long transmission lines.
Specifications: Designated Series 4600 for temperature and Series 4700 for pressure, transmitters are pneumatic force-balance devices employing gas filled thermal systems for temperature measurement and bellows elements for pressure.
Supplier: **Mason-Neilan, Nahatan St., Norwood, Mass., Phone: 7-4600 (Bulletin No. 214).**

Cushion-Tired Lift Trucks
. . . Are Highly Maneuverable



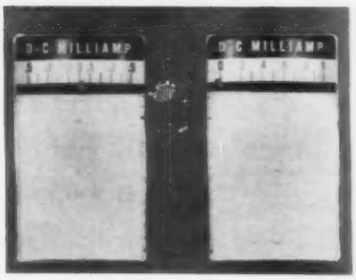
Applications: For loads of 6,000 to 8,000 lbs.
Advantages: Space Saver models have short turning radius, power steering as standard equipment, high torque engine, good visibility forward and rear, self adjusting brakes and low mast height.
Specifications: Stacking aisle widths are 99½, 101 and 105½ in. for the 6000, 7000 and 8000 lb. capacity models, and intersecting aisle widths are 71, 73 and 74 in. Engine is rated at 70 hp at governed speed of 2600 rpm, 168 lb.-ft. of torque at 1200 rpm.
Supplier: **Hyster Co., 1003 Myers St., Danville, Ill., Danville 6-2400.**

High Speed Slurry Pump
. . . Is Introduced



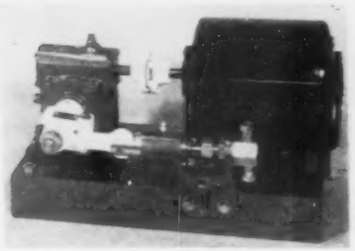
Applications: For handling suspension of sludge, lime or chemical process slurries.
Advantages: Specially designed for pulp and paper industry to provide both abrasion resistance and high speed. Easy to dismantle and reassemble, the pump features a renewable suction liner and semi-open impeller.
Specifications: The Type BA pump is available in cast iron, Ni-hard or stainless steel in 1, 1½, 2, 3 and 4 in. sizes.
Supplier: **Bulletin 188, Morris Machine Works, Baldwinsville, N.Y., NEptune 5-3931.**

Twin Recorder
. . . Saves Panel Space



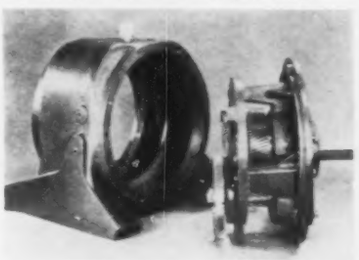
Applications: For use on instrument panels.
Advantages: A single case contains two types CH Recorder chart carriages and measuring elements. All design features of the CH Recorder line are incorporated, including 28 chart speeds from ¼ in. per hr. to 120 in. per min., throw-away plastic inkwell, 150 ft. long record rolls and extra hand space inside case to facilitate maintenance.
Specifications: Flange dimensions are 19 by 16$^{5}/_{16}$ in. Chart carriages are driven by a single drive motor in the right-hand carriage. Separate, double-speed drive motors are provided for chart speeds of 30, 60, 90 and 120 in. per min.
Supplier: **General Electric Co., Schenectady 5, N.Y., 4-2211.**

New Metering Pump . . .
. . . Gives Laboratory Accuracy



Applications: For metering minute quantities of costly or corrosive fluids.
Advantages: Ruggedly constructed with motor drive action on plunger for suction as well as discharge strokes, the miniPump has repetitive accuracy of ±1% of full capacity.
Specifications: Handles flow rates to 7880 ml. per hr. and pressures to 1000 lbs. per sq. in. Available with column valve type liquid ends of plastic, Milroy stainless steel or Hastelloy C. Drive is by ⅓ hp, single phase, 60-cycle, 115-volt electric motors.
Supplier: **Milton Roy Co., 1300 E. Mermaid Lane, Philadelphia 18, Pa., Chestnut Hill 7-8000.**

New Gear Line
. . . Has Standard Components



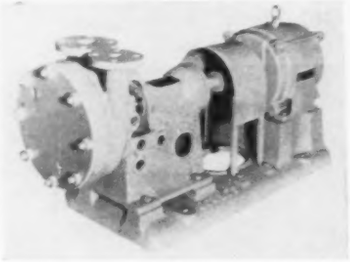
Applications: Drives for variety of machinery.
Advantages: Basic subassemblies and accessories are combined to make any helical-gear drive configuration, and use of parts common to a wide variety of configurations makes mass produc-

tion, automatic machines and advanced manufacturing techniques possible. Spin-flame heat-treated high-speed change gears are mounted on rolled spline shafts and can be mounted or replaced with common hand tools. Gears in triple and quadruple reduction subassemblies are also spline mounted. Gears are precision ground after hardening and meet AGMA standards for master gears. *Specifications:* Seven Moduline unit sizes to 30 hp are available with ratios of 5 to 1 to 625 to 1. Every unit has overhung load capacity in excess of any loads expected in service when using sprockets, pinions or pulleys for power take-off.
Supplier: **Westinghouse Electric Corp., Box 2278, Pittsburgh, Pa. EXpress 1-2800.**

Heavy-Duty V-Belt
. . . Prevents Belt Turnover

Applications: For long center industrial drives.
Advantages: Redesigned belt compression area and repositioned strength members give lateral and longitudinal stability. Belt is preformed before vulcanization to preserve the precisioned balance, de-stretched during manufacture, factory measured under controlled humidity and length certified. Vacuum package stabilizes belt length, practically eliminating V-belt matching problems.
Supplier: **Manhattan Rubber Div., Raybestos-Manhattan, Inc., Passaic, N.J., GRegory 3-2000.**

Steam Jacketing . . .
. . . For Chemical Pumps



Applications: For handling and melting point solids, aqueous salt solutions and viscous liquids where higher temperatures reduce viscosity.
Advantages: When entire system is heated to maintain solubility advantage, jacketing prevents precipitation and clogging, shaft scoring or seal damage. Savings in power, process water or product often result from raised temperature of pumped liquids.
Specifications: Available on all sizes and constructions of Goulds Fig. 3715 pumps for steam pressures to 100 psig or 338 degrees saturated steam. Fig. 3715 sizes ¾ x 1–7, 1 x 1½–7 and 1 x 1½–10, with cast iron casings, have a 50 psig or 300 degree steam limit. Jacket is of fabricated steel, asbestos gasketed, bolted to remachined casing cover and has ½ in. pipe tap inlet and drain connection.
Supplier: **Goulds Pumps, Inc., 38 Black Brook Rd., Seneca Falls, N.Y., LOgan 8-5811.**

Aluminum Gate Valves
. . . Are Lightweight

Applications: For handling problem gases and fluids.
Advantages: These aluminum alloy valves have fully revolving double disc parallel seat gate valve operation. Sizeable savings are possible in shipping, handling and installation as well as initial cost.
Specifications: Available in sizes from ½ in. through 24 in. and in types for every requirement where aluminum piping systems are used.
Supplier: **Darling Valve & Mfg. Co., Williamsport, Pa.**

PAPER MAKERS WANTED

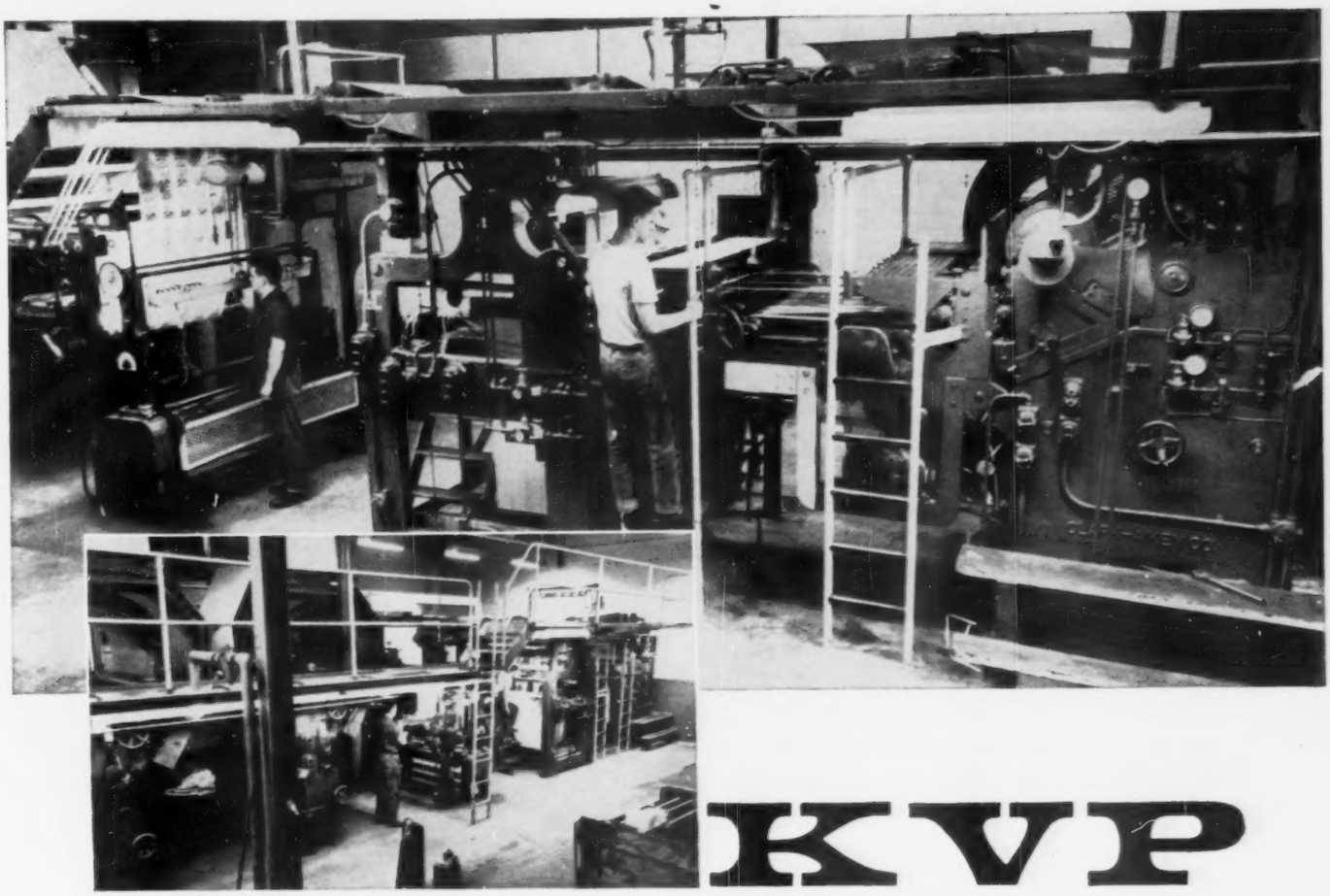
We are ready to consider applications for supervisory and operating positions for our new paper mill. This mill will manufacture bleached board specialties. The following positions are available:

Tour Foremen
Machine Tenders
Back Tenders
Third Hands
Fourth Hands
Beater Engineers and Helpers
Shipping & Finishing Supervisors
Boss Finishers
Cutterman
Rewinder men

Seybold Operators

Our mill is located in Southeastern North Carolina, which enjoys a moderate climate and many recreation activities. Fringe benefits include an excellent retirement plan, group insurance, paid vacations, etc. Write to:

Personnel Department, Riegel Paper Corporation, Acme, N. C.



KVP

demonstrates the Speed, Precision and Rigidity of Clark-Aiken Sheeters

In 1950, when The KVP Company, decided it would be possible to eliminate rewinding and greatly simplify handling by hooking a sheeter to the delivery end of its big, high-speed No. 10 four-color rotogravure press, selecting the right sheeter imposed a problem for KVP engineers.

It had to be flexible in its operation to permit synchronization with the press.

It had to be accurate to make each cut of the printed sheet right on the line.

It had to be rigid to withstand the strains of continuous high-speed operation and maintain this accuracy.

Based on their experience with Clark-Aiken Sheeters in the KVP finishing room, they decided that a 52" Type C Clark-Aiken Cutter-Layboy Unit would do the job best.

Wisdom of this decision is borne out in the following report from Dellmore Moffett, Superintendent of Printing of The KVP Company.

"The Clark-Aiken sheeter at the end of our No. 10 4-color rotogravure press is valuable to us for three things. First, its rigid construction. Second, its speed. Third, and most important, its accuracy. I am tempted to use the word 'unbelievable' ahead of the word 'accuracy' for it far surpasses our original expectation. We are actually able to control it within the width of a period, or small dot."

In addition, KVP enjoys the benefits of such exclusive Clark-Aiken design features as

- The "Spiral Shear" Cylinder Knife that makes cl. sharp cuts on any type and weight of stock.
- One-Piece Knife Assembly that automatically maintains alignment when squaring the sheet.
- Scale-Setting of Slitters and Joggers that makes possible straight-line travel between slitters and pile without use of tapes.
- Lifetime Tapes which outwear old types many times, practically eliminate stretch troubles.

If you are sheeting paper, pulp, board, film, foil or fabric and require sustained high-speed operation with sustained accuracy and low operating and maintenance costs, Clark-Aiken has a sheeter exactly suited to your needs and can furnish it with a layboy and roll stand exactly suited to your requirements and operating conditions. Clark-Aiken engineers will gladly study your sheeting operations and offer recommendations with actual cost and savings estimates.

THE Clark-Aiken COMPANY

957 SPRINGFIELD ROAD

LEE, MASSACHUSETTS

West Coast Office: 114 East Union Street, Pasadena, Calif.

Lester L. Murray, Sales, Sprout-Waldron & Co. . . .

Will serve Michigan State. He was i/c of activities related to their continuous digester. He is a registered professional engineer, and a grad of Bucknell U. He and his wife and two children now live in Ann Arbor, Mich.

Features Centrifugal Fans

A new catalog entitled Airfoil Centrifugal Fans from Westinghouse Sturtevant division describes the efficiency and quietness of airfoil blading for all-purpose applications in a complete standard line of centrifugal fans (Series 8000) covering every requirement up to 700,000 cfm and up to 16¾ in. total pressure. For catalog 1121, write Westinghouse Electric Corp., Sturtevant Div., Dept. T-406, 200 Readville St., Hyde Park, Boston 36, Mass.

St. Clair ..... Rector

Hyster Asst. Sales Managers

. . . Appointed in Hyster Co.'s newly created industrial truck division: WALTER A. ST. CLAIR, former Midwest district manager at Cincinnati; JAMES N. RECTOR, until recently district manager in Atlanta.

Offers Wall Charts

Two useful wall charts containing helpful suggestions on "How to Handle Becco Hydrogen Peroxide Safely" and "How to Test Becco Hydrogen Peroxide Bleaching Solutions" are offered by Becco Chemical Div., Food Machinery and Chemical Corp., Buffalo 7, N. Y.

Each measuring 16 x 21 in. and printed in large type that can easily be read from a considerable distance, the two charts are designed to be hung at points of peroxide storage and usage for quick reference.

Claire Lage, Represents Orr Felt in Middle West

. . . succeeding Frank B. Eilers, of Kalamazoo, who retires after serving Orr Felt & Blanket Co. since 1917. He will continue to service Sutherland Paper Co. Mr. Lage, who joined Orr in Mar. 1957, will cover Wis., Minn., western and upper Mich., and north Ill. He has had long experience in various facets of the paper industry, says President Morrison B. Orr.

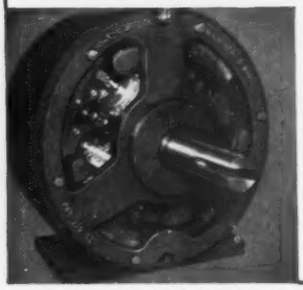
Johnson ..... Wise

Griffith Rubber Promotions

Extensive long-range expansion undertaken by Griffith in 1955 will be continued according to NORMAN J. JOHNSON who recently advanced from executive vice president to president of the firm. Improved facilities are being added at the plant in Portland, Ore. for applying coating and linings to pipe, fittings and tanks. In Seattle the Griffith subsidiary, Chemical-Proof Corp., is undergoing reorganization and new facilities for fabrication of plastic materials. Equipment has been added at Western Plastics & Coatings, Ltd., New Westminster, B.C. affiliate.

ZINA A. WISE JR., newly named vice president, has been assistant sales manager in charge of sales to pulp-paper mills. He will continue to head this division.

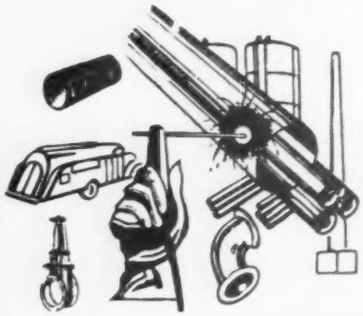
STOP TELESCOPING ROLLS MUSHROOMING CORES



Use Air Operated HORTON Clutches and Brakes to control the sheet tension on your winders and back stands. Take the guess work out of tensioning and let HORTON equipment give you uniform tight rolls all the time.

VARIABLE SPEED CLUTCH PULLEYS
GOVERNOR CONTROLLED BRAKES

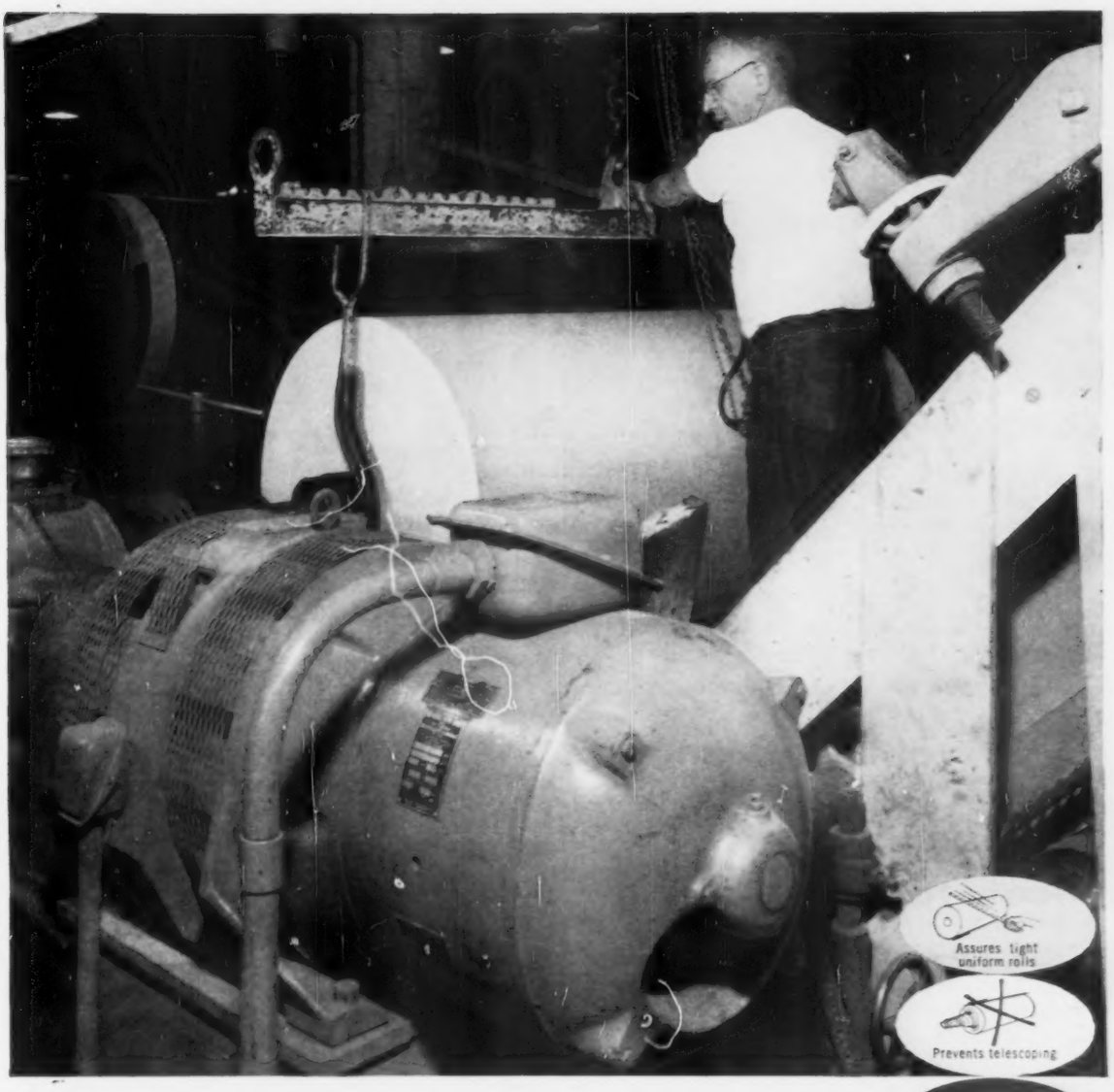
HORTON MFG. CO., INC.
MINNEAPOLIS 14, MINNESOTA



WE FABRICATE TO YOUR SPECIFICATIONS

A.S.M.E. Pressure Vessels	Fabricated Pipe	Fittings
Chemical Tanks	Chest Inserts	Flow Boxes
Stock Tanks	Laboratory Tanks	Wax Tanks
Brine Tanks	Tubing	Float Chamber Tanks

FELKER BROS.
MANUFACTURING CO.
MARSHFIELD, WISCONSIN



A dollar-saving wind-up drive

Louis Allis Ajusto-Spede® provides adjustable speed from A. C. power supply

Wind-up drives with precise tension control can reduce your "broke" and down-time.

Louis Allis Ajusto-Spede® drives have proven successful in eliminating the problems encountered with wind-up drives in all the paper industries from manufacture through printing and converting, and on all types of materials from tissue to board.

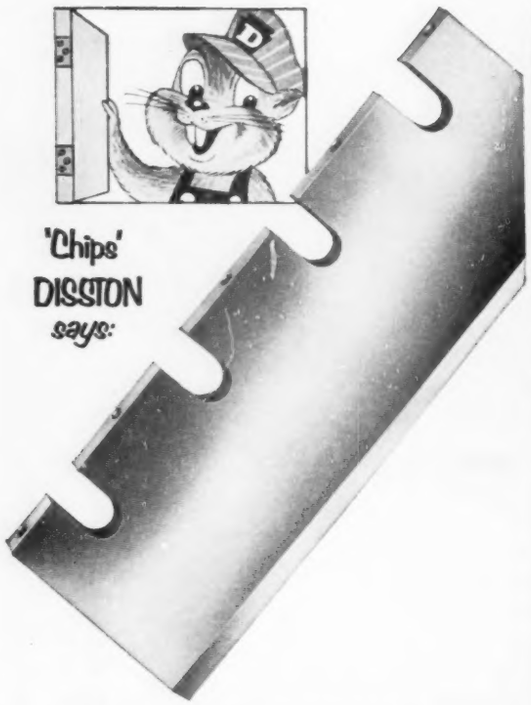
Here's what this versatile drive can offer you:

- 1 to 75 h. p.
- Linear speed range from 100 to 2,000 fpm
- Roll build-up ratios up to 15:1
- Controlled tensions from ½ lb. to 10 lbs. per inch of width
- Inertia compensation for maximum acceleration rates
- Adjustable stalled tension for smooth starts

A phone call to your local Louis Allis District Office will bring a skilled Louis Allis sales engineer. He'll gladly study your problem and advise — with no obligation. Or write for Bulletin 611E, "Ajusto-Spede Drives." The Louis Allis Co., 444 E. Stewart Street, Milwaukee 1, Wisconsin.

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE-SPEED DRIVES



"If you're looking for clean-cut chips —look to DISSTON!"

Each Disston Chip-Master Chipper Knife is made of high-alloy steel. Each is specially heat treated and tempered to hold its edge under severe operating conditions. Each is hard and tough at the business edge, softer at the slots to absorb shocks. And each knife face is ground super-smooth to give extra-clean, money-saving chipping.

See your Disston distributor today . . . and see for yourself why Disston Chip-Masters are first choice with those who demand low-cost knife operation.

SAVE ON KNIFE RESHARPENINGS AND REPLACEMENTS

with Disston 866 Paper Knives. Edges stay sharp, won't roll under or chip out. For free booklet, write to *Disston Division, H. K. Porter Company, Inc., Phila. 35, Pa.*

H. K. PORTER COMPANY, INC.
DISSTON DIVISION

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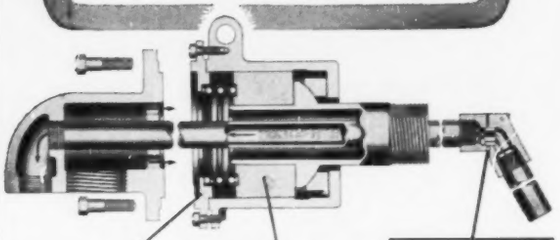
SELF-SUPPORTED TYPE with SYPHON ELBOW



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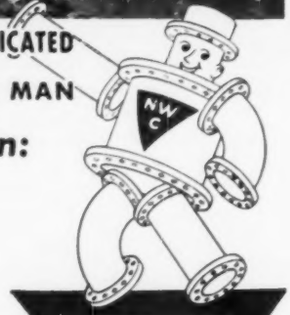

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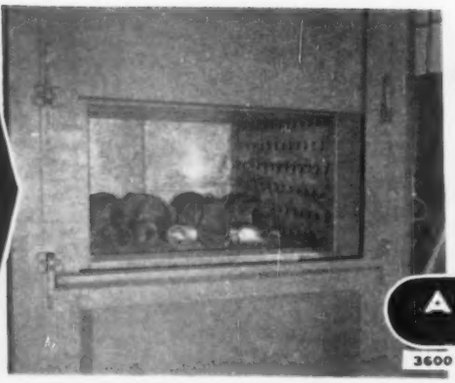

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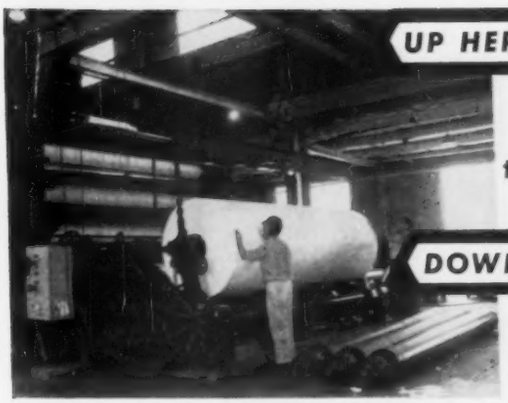

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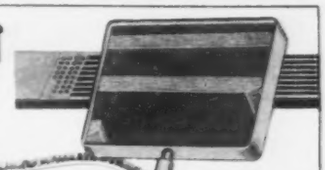

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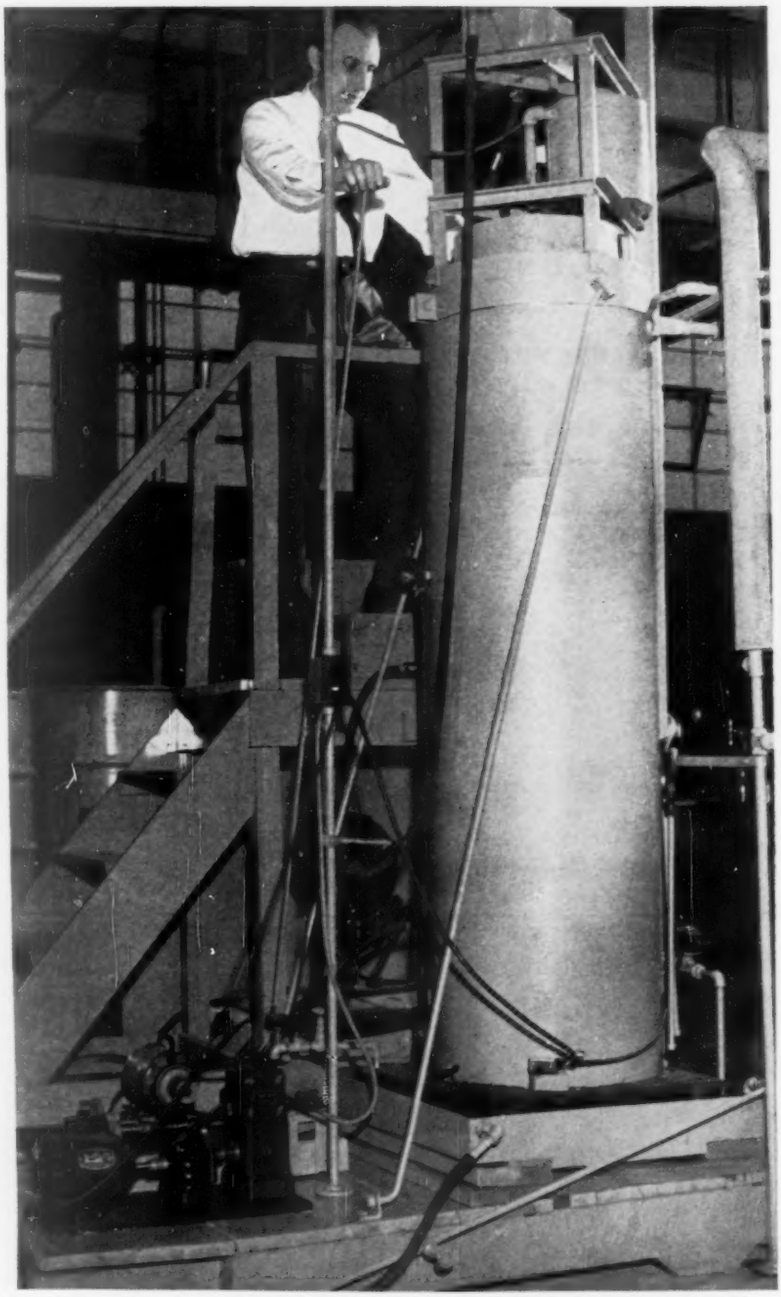

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The LAST WORD PULP & PAPER EDITORS' PAGE

How Are the Russians Doing?

Because of the interest in Russian science and industry, stimulated by the Outer Space investigations being made with Soviet Sputniks, PULP & PAPER is presenting in this issue a report on some of the most recent Russian developments in the pulp and paper field.

Since the Russians were able to send Outer Space satellites aloft before anyone else, some doubt is cast now on how much they have to steal in other scientific fields. Not much has been said lately about the theft of secrets. This is quite understandable. The Russians proved they had at least one secret first.

A year or so ago we recall hearing it said in paper industry circles that the Russians may be turning out more scientists, but there was nothing to worry about—they didn't have enough industries in which to give them useful jobs. Now we know they found uses for them, alright.

Since the Russians have been doing so well in development of rockets and satellites, perhaps they haven't been so backward in pulp and paper sciences and developments, either.

PULP & PAPER readers may judge for themselves, by turning to our WORLD Technical News section. This is an all-Russian section this month.

In this section, we present fresh translations of the most recent Russian pulp and paper technical literature.

Where BIG Fish are caught—right in front of Tacoma, Wash., pulp mill. . . . Chet Satiacum, Puyallup Indian, in his 100-yr. old dugout canoe, netted 60 salmon here in just one morning.

A "Believe-It-Or-Not"—Sportsman Defends Mills

On a 6-week visit in Pacific Northwest, Arthur H. Carhart of Denver, known in sportsmen circles as "the Dean of outdoors writers," learned first-hand of this industry's stream improvement accomplishments. The findings from his trip—undertaken at invitation of Weyerhaeuser Timber Co.—were written by Mr. Carhart and published as a special 16-page report by the Outdoor Writers of American Assn.

Mr. Carhart, who is chairman of OWAA's Water Policy Committee, gives recognition to high fiber recovery in the mills, points out the MgO process as a "big advancement" and salutes the ammonia base sulfite mills.

He also calls attention to the fact that some mills "are dragging their feet" in shifting to modern methods. To fellow OWAA members he urges, "Let's be sure we make a distinction in our writing work" between the "wilful stream foulers" and those that are on the main track.

Probably because the industry is largely attacking its problems expeditiously, he tempers this admonition with perspective provided in his very next paragraph: "It has not been economically possible to immediately shift to new and preferred processes at many mills. Other measures have had to be adopted. Until better ways are found to meet the problems, fair credit for trying is due those who deserve it."

As a sidelight Mr. Carhart tosses in the observation that some Pacific Coast anglers catching the larger fish "know that where there is moderate loading of the water with pulp effluent there is a build-up of the biological associations to produce some of the best food. Aquatic vegetation may thrive on the sugars going into the water in well-diluted pulp wastes. That's minnow pasture. And that's where the bigger fish head for a 'blueplate special mariners' lunch."

He also says, "There's another bit picked up. Tests have shown that members of the salmonoids have been maintained—repeat, maintained (Mr. Carhart's words)—in good health, for from 2 to 4 months in a 1-to-30 dilution of TOTAL pulp mill effluent. So at the pulp mill at Longview, Wash., where there is an immediate dilution of 1-to-200 when the wasted water goes into the Columbia, there can't be too much chance of really damaging levels of pollution right at the out-flow point."

The Carhart-OWAA report specifically cited the following firms in Washington and Oregon for their constructive accomplishments: Crown Zellerbach, Weyerhaeuser Timber Co., Spaulding Pulp & Paper, Scott Paper, Puget Sound Pulp & Timber, Publishers' Paper, and Western Kraft.

Moral: Invite the finger-pointers in so they can learn just how good a job you are doing.

All Over the Map

PULP & PAPER editors really spanned the continent in recent weeks.

Editor Al Wilson toured via four Northern Thruways, dropping off here and there to visit mills.

Maury Castagne braved wintry weather in Maine to "get his story" after two successive trips into Quebec within a month.

Bill Diehl really got around—from the Florida Everglades to Charleston, from Louisiana to the Okenefokee Swamps.

Louie Blackerby toured Vancouver Island and the Olympic Peninsula and was back in Seattle in December for the Supts. annual meeting.

Bill Diehl got a chuckle out of a sign he passed: "Welcome to West Monroe (La.)—26,715 friendly people—and one old GROUCH."

In remote bayou country, where there is as much water as land, he found out the natives permitted their wives to speak only French when strangers were about.

He covered half the state of Florida with Carl Brice, a king-size man and pulpwood producer, in his private plane, snapping pictures of some mighty rough logging—tractors over the engine cowling in water, hauling out pine and 200-year-old cypress.

Watch future issues of PULP & PAPER for the stories these editors gathered from coast to coast, from Canada to the Gulf.

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